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ABSTRACT

Fifty-nine papers on language research and linguistic theory from the annual forum address these topics: correctness in language; aspects of neurolinguistics and psycholinguistics; historical linguistics and language evolution; linguistic philosophy; aspects of syntax; aspects of discourse analysis; lexicon and semantics; language contact and linguistic borrowing; suprasegmentals; aspects of pragmatics; music and language; aspects of grammar; morphology; pragmatics; language teaching; language processing; and phonetics and phonemics. Languages studied include Welsh, English, Basque, Yup'ik Eskimo, Japanese, pidgin, Korean, Polish, French, Catalan, Mandarin Chinese, and Old and Middle English. Selected papers include: (1) "Correctness in Language: Political and Otherwise" (Makkai); (2) "How the Brain Learns Language" (MacWhinney, Feldman); (3) "Some Grammatical Evidence for Eurasiatic, Especially Pronominal" (Greenberg); (4) "Functional Passive Rethought" (Rashidi); (5) "Markedness Effects in Welsh Short Plural Forms" (Lommel); (6) "Semantic Specification/Semantic Emergence: Against the 'Container' Metaphor of Meaning" (Harrison); (7) "Basque and the Other Dene-Caucasic Languages" (Bengston); (8) "Redefining Language" (Bradford, Melby); (9) "The Nature of the Causee in Binding" (Katada); (10) "Subtle Signalling of Logical Relations in News Reporting" (Jordan); (11) "Idiomatic Properties of Eighteenth Century English" (Akimoto); (12) "Chiac: The Hybrid Vernacular of Mouncton Acadian Teenagers" (Babitch); and (13) "Tagmemic Principles and Music Analysis" (Avery). (MSE)

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THE TWENTY-THIRD LACUS FORUM

1996

TOBY D. GRIFFEN

Series Editor

THE
TWENTY-THIRD
LACUS FORUM
1996

Edited by ALAN K. MELBY

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PREFACE

ALAN K. MELBY

Brigham Young University

THE TWENTY-THIRD FORUM of the Linguistic Association of Canada and the United States (LACUS) was held on the Provo, Utah, campus of Brigham Young University from August 6–10, 1996. The present volume is a written version of many of the oral presentations given during that week. There is a wealth of carefully gathered data and thoughtfully formulated hypotheses for the reader to sample and savor. Those who are willing to look beyond their particular speciality will discover gems that may someday be combined with others to create a new masterpiece. For example, the reader not focused on psycholinguistics will learn from the contribution of Gary Prideaux that most studies in lexical access have dealt with comprehension rather than production. Prideaux proposes a self-declared 'modest contribution to the research in lexical access within language production'. One of his studies compares 'on-line' and 'off-line' descriptions of a movie clip. These terms, derivative of the computer age, help us see that the spoken/written contrast is insufficient. Play-by-play oral descriptions contrast with after reflection oral descriptions. I could go on and on and on, like the bunny in advertisements for one of the major brands of batteries. Of the seventy three papers presented at the Forum, fifty-nine are published here. Each deserves attention. Reader, enjoy!

One way to describe this volume is to consider its presentation, content, and setting (not to be equated with syntax, semantics, and pragmatics).

The presentation of this volume is considerably different from previous volumes in the series. For the first time in this series, you see a completely digital publication. Many papers were submitted on diskette at the time of the Forum. Some were sent by electronic mail. A few were scanned and converted to text files using imaged character recognition. All text and tables and figures were brought into a single desktop publishing system and a single font family. Obviously, for a linguistics publication in particular, this involved enormous care and ingenuity, including the development of custom characters for the font family. (See the colophon for more details.) The result is a substantial feeling of presentational uniformity across diversity of topics. Clearly, this digital version would not have come about without the substantial funding provided by the Brigham Young University (BYU) Department of Linguistics. Thank you, John Robertson, Department Chair. Importantly, the Forum itself could not have been held at BYU without the generous support of the College of Humanities. Thank you, Dean Randall Jones. Operationally, the conference could not have been run without the teamwork of my student assistants, Necia Stanford, Arle Lommel, Raquel Lodeiro, Wei Ly Liu, and Chris Bradford, and my family, including my supportive (and only) wife Ulla-Britta and my daughter-in-law Guenevere Nelson-Melby. In addition we would like to thank Linda Adams of the BYU Humanities Publications Center and the students of her English 410R class for their many hours of format proofing. However, after the conference was over, the presentation of this volume would never have reached fruition without the long suffering (nine months long) efforts of Arle Lommel. Perhaps, this project is as close as he will come to having a baby. Congratulations, Arle.

The content of this volume is so broad that 'linguistics, in all its glory' is barely sufficient to span it. The papers are so rich that their assignment to a section is often somewhat arbitrary. A paper in the 'cross linguistics' section may also fit in the section on syntax. The entire table of contents, rather than a single section, should be perused when trying to find a particular paper. Even then, however, the titles do not do justice to the content of the papers. Please pay special attention to the invited and award-winning lectures.

Although not immediately obvious from the table of contents, we enjoyed presenters from the following countries other than Canada and the U.S.: Japan, Korea, China, Finland, and Saudi Arabia. In addition, at the time of the Forum, Linda Stump Rashidi, winner of the Presidents' Post-Doctoral Prize, was preparing to move to Morocco. If the current exception of a totally digital publication becomes a tradition for the LACUS Forum series, then at some point another step could be taken: SGML (the ISO standard for defining markup systems). If the entire volume were marked up using SGML with the language of every unit of text identified and all characters entities mapped to their Unicode* equivalent, then a digital edition with multilingual searching capabilities could accompany the paper edition.

The setting of this volume is in one sense Provo, a university town in the middle of the Rocky Mountains, since the papers were presented there. The meeting in August 1996 was not just a series of interesting lectures. It was a meeting of whole people, not just minds. Although it can not be seen from the papers in this volume, an important aspect of LACUS is its social cohesion. Attendance was good, although some regular faces were missing, including Adam Makkai, Sydney Lamb's predecessor, who was absent because of illness and other commitments. Over the years a most remarkable aspect of the LACUS meetings has been the ongoing respect shown to each other by proponents of various approaches to the study of language. May the tradition of respect in diversity continue!

*A 16-bit character set with over 50,000 characters

I. SPECIAL LECTURES

1996 PRESIDENTIAL ADDRESS

CORRECTNESS IN LANGUAGE: POLITICAL AND OTHERWISE

Valerie Becker Makkai

University of Illinois at Chicago

One of the first linguistic principles that most of us were taught as we began to study the subject is that linguists operate according to certain scientific procedures—specifically that we observe the linguistic facts and report them objectively without editorializing. We engage in **de**scriptive as opposed to **pre**scriptive linguistics. This, of course, does not mean, as I always hasten to admonish my students, that we have no standards, or that anything goes, or that we do not, in our personal use and observation of the language, judge and correct those usages which we as individual speakers deem inappropriate. We usually are as careful as anyone else, and certainly more so than some, to use that form of language which is generally regarded as grammatically correct.

However, as we all know, correctness—like beauty—is often in the eye of the beholder. And we occasionally face the same dilemmas as other speakers of the language in deciding whether a particular usage is acceptable or not. But we have the advantage, which the average layman does not, of linguistic sophistication and training to help us in making our decisions. It is my contention that this is not only an advantage but a responsibility. As linguists, we have the responsibility to set standards and to uphold those standards that we, in our considered opinion, feel are appropriate. We have the responsibility to examine new developments and trends as they occur in language, to report on these developments, and to expose those trends that, for whatever reason, we deem undesirable. We may not be able to reverse a trend, but we can make people aware of what they are doing to the language; and, if nothing else, our writings on the subject can provide useful information for future generations of scholars.[1]

There is a pervasive trend afoot today, of which we are all aware, involving so-called 'political correctness'. It encompasses, of course, more than just language, but language is its primary focus, and the first evidence of whether or not a person has a 'politically correct' attitude is often his use of politically correct or incorrect language.[2] Brought down to its lowest common denominator, politically correct (or PC) language involves the replacement of a term which is viewed as taboo with a euphemism. The phenomenon of taboos arising in language and the replacement of the taboo words with euphemisms is a well-known concept and is probably a universal event in language. What makes PC language different is, first, the large number of forms affected; second, the fact that there is a deliberate movement to promote such changes and that the changes are almost all being made with conscious intent; and, thirdly, the fact that there is considerable resistance to the movement, a good deal of it taking the form of humor or mocking.

In fact in spoken conversational English, in particular, a high percentage of PC usage is obviously intended as humorous. For example, a high school student calls one of his friends who is rather short in stature 'vertically challenged', a married woman who does not have a job but stays home to take care of the children refers to herself as a 'domestic engineer', a seventy-five year old man refers to himself as 'chronologically gifted', and so on.

In written English, as well, there have been many parodies and tongue-in-cheek presentations of PC language including books such as Beard and Cerf's *The Official Politically Correct Dictionary and Handbook* (1993), Garner's *Politically Correct Bedtime Stories* (1993) and its sequels *Once Upon a More Enlightened Time* (1994) and *Politically Correct Holiday Stories* (1995), and articles such as Rosenau's 'How to Speak Post-Modern, Being a Glossary of Actual Post-Modern Terminology in Current Usage Made Sensible for the Un/informed and Semi(initiated)' (1991a) and Matthews 'Brave, New "Cruelty-Free" World' (1991). In addition, many newspapers, syndicated columnists and commentators have at various times poked fun at the movement in a variety of ways. Consider, for example, the following news item from the Brooklyn, Ohio, *Sun Journal*: 'Police arrested two Cleveland women who allegedly were loitering in order to promote themselves as morally challenged freelance entertainers to various individuals passing through the intersection of West 44th Street and Lorain Avenue at about two in the afternoon'.[3]

People have had a great deal of fun concocting so-called politically correct alternatives to all sorts of words: *terminally inconvenienced* for *dead, chemically inconvenienced* or *sobriety deprived* for *drunk, temporally challenged* for *chronically late, vocationally deprived* for *unemployed, specially organized* for *sloppy*, and *insignificant other* to refer to an ex-spouse, ex-boyfriend or ex-girlfriend (all cited in Beard & Cerf 1993).

The trouble is that listeners or readers are sometimes hard put to determine whether a usage is serious or not. Was *The San Diego Union-Tribune* serious when it referred to a woman who committed suicide in the summer of 1992 as *spiritually dysfunctional* rather than *suicidal*?[4] Were Kramarae and Jenkins serious when they coined the term *spinster's degree* to replace *master's degree* in order to point up 'the traditional attention accorded the male side of the gender-linked terms' (Kramarae & Jenkins 1987:141)? Is the *New England Journal of Medicine* serious when it refers to a corpse as a *nonliving person*?[5] And was the Department of Rhetoric at the University of California at Berkeley serious when it suggested, in a 1991 handout, that the term *bald* be replaced by *follicularly challenged* and that books and other paper products be referred to as *processed tree carcasses*? One suspects that at least some of these usages were not intended to be humorous.

The question then arises, if there are terms that may be regarded as too direct or blunt and that perhaps should be replaced by euphemisms, where do we draw the line? When do attempts to be sympathetic to other people's sensibilities become humorous or, worse yet, ludicrous jokes? How far can or should people go in attempting to mold the shape of the English vocabulary to suit their agenda? In order to answer these questions we need to look at the history of the PC movement and the various forms it has taken.

The notion of political correctness in language had its advent with feminist objections to the use of gender specific language, most of which appeared to be male oriented, and which was viewed as exclusionary or sexist. People began to suggest various modifications to the vocabulary which were designed to remove these so-called sexist words and expressions. As the idea that the language should be changed to make it more gender-neutral spread, however, these same processes came to be applied to other areas of the language, such as terms referring to occupations, to ethnic groups, and to a variety of minorities, all of whom, in one way or another, are regarded as being potentially sensitive about their status or condition and who therefore need to be treated with caution and understanding. A further extension of political correctness has occurred in the replacement of terms referring to unpleasant activities or events with terms that in one way or another soften the blow or make the event or act seem less despicable. This latter form of PC language has often taken the form of deliberately manipulating attitudes or ideas. And it is in this area, in particular, that the most egregious replacements of vocabulary have taken place.

I. GENDER SPECIFIC LANGUAGE. One of the first gender-related changes that occurred in English was the addition of *Ms.* to the vocabulary. This form of address, which was intended to replace *Miss* and *Mrs.*, was deliberately created in order to allow reference to females without immediately indicating their marital status. It caught on rather quickly, but not necessarily for the reasons for which it was coined. Rather it was easily accepted because it allowed speakers to refer to and address with a neutral form those women whose marital status was unknown. Most speakers of English have retained the forms *Miss* and *Mrs.* and continue to use them when the person's status is known.

Several years ago a LACUS member complained about the line on our membership renewal form which allowed the individual to choose a preferred title from among the following: *Dr.*, *Prof.*, *Mr.*, *Mrs.*, *Miss*, and *Ms.* She labeled the inclusion of *Mrs.* and *Miss* as sexist, asserting that *Dr.*, *Prof.*, *Mr.* and *Ms.* should be the only choices available. We did not change our renewal form, and many, if not most, women choosing among the three forms *Ms.*, *Miss*, and *Mrs.* continued to indicate that they wanted to be addressed as *Miss* or *Mrs.*

The feminist movement spawned many other new terms to replace words which are or which came to be considered gender specific. In addition to various occupational terms, which will be discussed below, an amazing variety of other words were seen to contain an undesirable reference to males (often going in the face of historical facts and/or speaker intuition).

The form *man* itself received the most immediate attention. One of the more commonly accepted changes was the replacement of *chairman* by *chairperson* and eventually simply *chair. Madam chairman* as a form of address for a woman has also largely dropped out of use. We often find replacements such as *artificial* or *synthetic* for *man-made* (Dumond 1990:82), *human resources* for *manpower* (Safire 1991a:368), and *human* for *man* in its generic sense. Some people have objected, however, that *human* itself contains the word *man*, and they therefore prefer to use words like *person* or *individual* instead. Thus a *snowman* is now a *snowperson* or a *snow creation* (Dumond 1990:86) and a *gingerbread man* is now a *gingerbread person* (Goddard 1989) or sometimes a *gingerbread figure.* Less accepted, but nevertheless used, are such replacements as *maintenance hatch* (Dumond 1990:82) or *personnel access structure* (Neaman & Silver 1991:305) for *manhole, humanslaughter* or *personslaughter* for *manslaughter* (Sorrels 1983, cited in Baron 1986:189), and *freshpeople,* which has been found to occur in publications of a number of colleges and universities to replace the ostensibly sexist form *freshmen.* Other schools have chosen the more mellifluous *first year student* as a replacement. NASA officials have decreed that *manned* is a sexist term and that henceforth space flights by human beings will be referred to as *crewed* or *habitated.* A NASA representative declared 'We have been ordered to delete any reference to sex, on the grounds that "manned" flight is crude and "crewed" is PC' (Castro 1992a:13). Some of the more outlandish euphemisms that have been suggested include *wofem* (Goldfield 1983: 119), *woperson,* or *person of gender*[6] (as well as several other variants) for *woman*; *womage* to replace *manage,* especially when the 'womaging' is being done by a 'woperson' (Frank & Treichler 1989:200); *hufem* (Goldfield 1983:92) or *humyn* (Decker 1991) for *human*; *femtal* for *mental* (Goldfield 1983:94); and *efemcipated* for *emancipated* (Goldfield 1983).

Other supposedly sexist forms that have been singled out for change are replacements such as *herstory*[7] or *hystery*[8] for *history, himmicane* (Frank & Treichler 1989:200) for *hurricane* (an example of reverse sexist language), and *hera* (Frank & Treichler 1989:202) or *she-ro* (coined by poet Maya Angelou and cited in Frank & Treichler 1989:200, 202) for *hero.* The generic use of *he* has, of course, become so much of a taboo, that many textbook authors have felt the need to apologize for and/or explain in a preface their particular choice of pronoun usage. Common choices are the consistent use of the phrase *he or she*, the alternate use of *he* and *she* in successive paragraphs or sentences, the form *he/she* or *s/he*, and the increasingly common use of *they* in a singular sense. The gender-neutral form *co*[9] has been suggested as a replacement for both *he* and *she* although, curiously, the already existing form *it* has not.

II. Occupational terms. As people focused on gender-specific terms, it was natural that one of the categories of words that came under attack was occupational names that included the form *man*, especially as women began to fill these rolls. Thus, very soon *mailman* was replaced by *mail carrier* or *letter carrier*, *fireman* by *firefighter*, and *policeman* by *police officer*. University of Illinois professor Dennis Baron (1986:189) has cited *batchild* and *ballchild* as suggested replacements for *batboy* and *ballboy* respectively, and when the Little League went coeducational nationally its officials decreed that the *first baseman* should now be called the *first baseperson* (Brenner 1993).

Other occupational terms that were objected to on sexist grounds were those that contained feminine suffixes such as *actress*, *waitress* and *stewardess*. These three exemplify the three ways in which such forms have been changed. Words such as *actress* have simply been eliminated and the already-existing *actor* has been adopted as a gender-neutral term. With forms such as *waitress*, on the other hand, rather than using *waiter* to apply to both sexes, a new form, *waitperson*, was created to apply to both. An alternative form, *server*, is also commonly used. This latter possibility, the deletion of existing forms and their replacement with a totally new form, is also exemplified in the case of *stewardess* which has been replaced by *flight attendant*, again applied to both males and females.

Soon enough the attention paid to so-called sexist occupational terms created the attitude that any occupation or activity that might seem less than glamorous should also be euphemised. As a result we have *sanitation engineer* for *garbage collector*, which itself was changed from *garbage man*, *maintenance engineer* or *environmental hygienist* (Lutz 1988:41) for *janitor*, *funeral director* for *undertaker*, and *seasonal employee* for *migrant worker* (Neaman & Silver 1991:300). *Dishwashers* are now *utensil sanitizers* according to the Department of Rhetoric at the University of California at Berkeley (1991), while *car washers* are *vehicle appearance specialists* (Lutz 1988:41). In a 1991 PBS broadcast on the subject of AIDS, prostitutes were characterized as *sex care providers*.[10] They have also been variously termed *sex workers* (McClintock 1991:26), *sexual surrogates*,[11] and *persons presenting themselves as commodity allotments within a business doctrine*. This latter term was actually used in a proposal submitted by the city of Allentown, Pennsylvania, for a rehabilitative 'safe house' (Lutz 1989:227). *Slaves* are now to be referred to as *enslaved persons* (New York State Education Department 1991:43) in order to draw attention to the involuntary nature of enslavement, *prisons* or *jails* are now *correctional facilities*, and *prisoners* are *guests in a correctional institution*[12] or *clients of the correctional system* (Rawson 1981:14). *Prison cells* have become *custody suites* (Rees 1993:31) and *felons* are to be called *criminalized populations* to emphasize that 'the blame for illegal actions' is to be placed 'on the dominant culture and its institutions, rather than on the individual members of oppressed groups' (Leo 1992b).

Home economics has been replaced by *domestic arts* (Capek 1987:131) or *human ecology*—the University of Texas, for instance, has changed the name of its Department of Home Economics to the Department of Human Ecology.[13] A *housewife* has been variously termed a *human ecologist*, a *domestic engineer*, or a *domestic incarceration survivor* (D'Souza 1991:214). The term *significant other* has become common as a gender-neutral substitute for any number of relationships ranging from marriage to steady dating (Safire 1986:10).[14] When two *significant others* live together, whether married or not, they are generally referred to as *domestic companions* or *domestic partners*. In fact, in 1993 the state of New York made 'domestic partnership' an officially recognized legal status (*The New York Times*, March 4, 1993, p. A1).

There has been a tremendous proliferation of euphemisms for the sensitive subject of losing one's job. For instance, when a person has been *fired* from a job, he or she has been *dehired, decruited, deselected, selected out, indefinitely idled*,[15] *involuntarily separated, involuntarily leisured* (Lutz 1990:133), *nonrenewed*, or *outplaced*. In a news item on CBS radio dealing with a study of workplace anxiety, a psychologist referred to children 'playing outplacement Barbie'.[16] A fired individual can also be referred to as having been *vocationally relocated* or *presented with a career-change opportunity* (Beard & Cerf 1993:150).

When a company fires a large number of people at once, the company is *downsizing, rightsizing, streamlining, destaffing, rectifying a work force imbalance, correcting a redundancy of human resources*, or *implementing a skill-mix adjustment*. (Beard & Cerf 1993:150). Notice here, as elsewhere, the attempt to manipulate public opinion through the use of euphemisms. If your company is 'streamlining' this must be a positive act, and the firing of a number of staff is just the unfortunate fall-out from this basically happy event. Such manipulation will be dealt with later.

A person who has been thus *indefinitely idled* may describe himself as being *between jobs, nonwaged* (Streitfeld 1991), *occupationally dispossessed, vocationally deprived* (Beard & Cerf 1993:50), or *in an orderly transition between careers* (Lutz 1990:133). People who, perhaps because of being *outplaced*, are now without a place to live should, according to a Long Island schoolteacher, be called *houseless* not *homeless* because, as she put it, 'home is wherever you are' (Leo 1991b). Such people can also be termed *underhoused*[17] or *involuntarily undomiciled* (Beard & Cerf 1993:39).

Other activities whose names have been euphemised include certain 'good' types of killing which are termed *euthanasia*, while *suicide* can now be viewed as *autoeuthanasia* or *voluntary death* (Rees 1993:131). (Military killing will be dealt with below.) *Rape* is now, in its more benign forms, only *date rape* or *acquaintance rape.*[18] *Dead*, aside from its many more conventional euphemisms, should, according to the Berkeley Rhetoric Department, be referred to as *metabolically different*. Among medical euphemisms are the terms *cerebral accident* for a *stroke* and *condition* to replace such insensitive words as *disease*, *malady*, and *affliction* ('Words We Love to Hate' 1990). Death in the hospital is regularly termed a *terminal episode* or a *negative patient care outcome* (Lutz 1990:67).

Animals are not ignored in the effort to be sensitive to feelings. *Pets* are now to be referred to as *animal companions* (Leo 1991c) or *companion animals*, while the pet's *owner* or *master* is now its *human companion*. In fact, the American Humane Society now suggests that the pet owner be referred to as the *human companion of a nonhuman companion.*[19] *The Animals' Voice Magazine*, whose motto is 'Through me the dumb shall speak', has suggested that nonhuman animals be referred to as *the voiceless.*[20] (Of course their use of the word *dumb* in their motto is certainly not PC. An earlier, though now discarded, euphemism would be *mute*, but this has since been replaced by *vocally challenged* or *orally challenged* [as recommended by the Berkeley Department of Rhetoric].) *Zoos* must now be called *wildlife preservation centers* according to the New York Zoological Society, which has recently renamed itself 'NYZA/The Wildlife Conservation Society' (Clines 1993).

III. ETHNIC TERMINOLOGY. As the PC movement spread, one of the areas that was seen to need improvement in sensitivity was the vocabulary used to refer to various ethnic groups. These terms have over the years been the subject of much change, as certain terms became taboo, euphemisms were created to replace them, and then the euphemisms themselves became taboo, only to be replaced by a new set of euphemisms. Nowhere is this more apparent than in terms used to refer to the Negroid people. Although at one time the term *colored* was considered acceptable,[21] it developed a negative connotation. At the same time *Negro* was considered a polite and sensitive term to use. But this word, too, came to be regarded as taboo in some of its (originally) regional pronunciations such as *niggra* and *nigger*. *Negro* was still accepted as the desirable word to use until the 'Black Is Beautiful' movement began in the late 1960's. Then in a very short period of time *Negro* came to be regarded as no longer acceptable, and it was replaced by *black* as the culturally sensitive euphemism. In recent years, however, *black* has begun to be dropped in favor of *African-American*. The term *black* is to be avoided, according to Robert Moore in his 1988 article 'Racist Stereotyping in the English Language', because 'the symbolism of white as positive and black as negative [is] pervasive in our culture... The definition of *black* includes "without any moral light or goodness, evil, wicked, indicating disgrace, sinful", while that of *white* includes "morally pure, spotless, innocent, free from evil intent."'. On the other hand, the Multicultural Management Fellows of the University of Missouri Journalism School, which put out a *Dictionary of Cautionary Words and Phrases* in 1989, caution their readers about the use of *African-American*, stating that 'it may be objectionable to those persons preferring *black*'. The term *person of color* (Lorde 1988:355) has also come into vogue, but most blacks object to it on the grounds that it includes all nonwhite races. The Commission on the Status of Women Forum has declared the latter term unacceptable because it 'obscures diversity and specificity and lumps all racial and ethnic groups together, thus facilitating the tendency in language to universalize' (Kramarae & Treichler 1985:499). A curious example of the uncertainty that the black community itself feels in dealing with the proliferation of terms is a recent poster circulated at the University of Illinois at Chicago advertising an art exhibit. The heading of the poster declared 'Visiting Artists Series of the African-American Cultural Center and the Black History Month Program'. Be that as it may, it should be noted that among the black community it is not at all uncommon for people to call each other *nigger*. It is perhaps a way of reclaiming ownership of their identity in the same way that the gay community has resurrected the hitherto derogatory term *queer* to refer to themselves (cf. Stanley 1991). There exists an advocacy group which calls itself *Queer Nation*, and at a gay rally for President Clinton (shown on Dateline NBC, July 10, 1996) the participants were heard to chant 'We're here, we're queer, and we're going to the White House'.

While blacks and gays have participated, recently at least, in their own naming, some other ethnic groups have had euphemistic terms imposed on them by others, often without their assent. For instance, Americans of Spanish language background have variously been called *Hispanic*, *Latin American*, *Chicano/Chicana*, and *Latino/Latina*. Author Sandra Cisneros claims that *Hispanic* should not be used since it was 'imposed' by the U.S. Census Department. She terms it 'a repulsive slave name' and refuses to permit her work to appear in any anthology that contains the word (Gonzales 1992). Her attitude is reflected in that of many others of her heritage. On the other hand, according to the directive put out by the Smith College Office of Student Affairs, *Chicano* and *Chicana* are the preferred terms among those of Mexican-American descent 'to reflect their concern about preserving their culture and heritage as opposed to assimilating into the dominant Eurocentric culture of the USA', while *Latino* and *Latina* are identified as names created by people of Latin-American descent and culture to emphasize their connection with that part of the world (Smith College Office of Student Affairs 1990).

American Indians constitute another group that has been given a number of names. For a short time *Native Americans* was the term of choice, but it has fallen from favor because the word *American* is of European origin (Leo 1991a). Also both the terms *Native Americans* and *native peoples* are considered inappropriate by some because the word *native* can have derogatory connotations (Beard & Cerf 1993:37). The term *indigenous peoples* has been suggested as a better alternative. But in spite of all this euphemising many Indians assert that they still want to be called *American Indians.* A similar imposition of terms has occurred with the Eskimos of Alaska. In recent times they have been called *Native Alaskans, Inuits,* and *Alaskan natives,* but many of them insist that they do not mind being called *Eskimos* (Beard & Cerf 1993:47).

Other politically correct terms have been created to refer to various peoples and ethnic groups in America. For instance the term *nonindigenous American* was coined to refer to everyone living on U.S. soil except those descended from precolonial peoples. *Newly emerging peoples* has been suggested to refer to 'nonwhites', while *non-emerging peoples* or *no-longer emerging peoples* should be used to identify those national or ethnic groups which have died out entirely (Beard & Cerf 1993:48–49). With reference to skin color, just as *black* is considered an undesirable term, so *white* is also to be avoided. Professor Leonard Jeffries of the City College of New York has suggested the euphemism *melanin impoverished* since 'white folks are deficient in melanin' and thus are 'less biologically proficient' than blacks (D'Souza 1991:259 quoting Jeffries in the *Campus Report* June 1988:1,8).

IV. OTHER MINORITY GROUPS. Among other minorities that have come to be regarded as sensitive to their status and therefore needing to be spoken of with euphemistic terms, probably the most apparent are those with various physical handicaps. The earlier term *crippled* has acquired such a strong taboo status that it is seldom used any more as a descriptive adjective. As a verbal form it may still be used, as in *He was crippled in the car accident.* For the adjectival form, *handicapped* became the common euphemism for *crippled,* yet *handicapped* itself has come to be viewed as taboo in some circles when describing people. It is still used in such phrases as a *handicapped parking space* or a *handicapped parking sticker.* Otherwise, various euphemisms have grown up to replace it. These range from *physically challenged* (as in an ad for a bank which 'offers special services for the physically challenged'[22]) and *physically different* (Blumberg 1990) to such less common forms as *differently abled,* which is used for both the physically and the mentally disabled (Smith College Office of Student Affairs 1990; also Neaman & Silver 1991), *uniquely abled* (Leo 1991a), *physically inconvenienced,* and the slightly silly *handi-capable* (Matthews 1991). Such individuals may be characterized instead by the nature of their handicap—*paraplegic* and *quadriplegic,* for example, are used to refer respectively to people with impairment or paralysis of two, or of all four limbs. And in order that those of us who are not disabled do not feel too complacent about our condition, we are to be referred to as *temporarily able* (Osman 1983, quoted in Kramarae & Treichler 1985:444–45).

Other handicaps are similarly euphemised. It is no longer PC to call people *blind*. Rather they are *visually impaired* or *visually challenged*. A person who was formerly called *deaf* is now *hearing impaired, aurally challenged* or *aurally inconvenienced* (Matthews 1991, and Department of Rhetoric, University of California at Berkeley 1991). Recently, however, both *visually impaired* and *hearing impaired* have come to be regarded as undesirable terms since *impaired* connotes a negative quality, so they have generally been replaced by the forms with *challenged*. Those with mental impairments, who used to be called *retarded*, are now viewed as *developmentally challenged* (Matthews 1991), *mentally challenged* (Streitfeld 1991), *special* or *exceptional* (Neaman & Silver 1991:161), or *people with special needs*.

The problem with a number of these euphemisms, however, is that they are less than precise and often actually ambiguous. Is a *hearing impaired* person totally deaf or just hard of hearing? Does *developmentally challenged* refer only to someone who is mentally retarded or can it also be used to refer to delayed physical development? Is an *exceptional* child now only one with mental impairment, or can the term still be used, as it once was, to refer to one who is intellectually gifted?

There have been some voices of reason in all of this confusion. A 1996 National Institutes of Health announcement of grants for Communication Disorders Research sensibly distinguishes between terms when it refers to 'individuals who are deaf or hearing impaired'.

And within the handicapped community itself, we find much less sensitivity to terms, at least when they are talking about themselves. Marlee Matlin, the Academy Award-winning deaf actress, appeared in The Disney Channel's 'Adventures in Wonderland', where 'she portrayed the March Hare's hearing-impaired cousin who teaches sign language to the residents of Wonderland after the Red Queen forbids anyone to talk. When the show aired, many viewers were surprised to hear Matlin's character described in the show as "deaf". ...But Matlin insists it was quite all right with her. "Life is too short to worry about being politically correct," she said, "I mean, deaf is deaf"'.[23] Georgia Griffith, who is both blind and deaf, hosts six CompuServe on-line discussion groups. 'She notes that she was born *blind*; then people began calling her *visually handicapped*, then *visually impaired* and finally *visually challenged*.' 'And', she says, 'I can't see a bit better!'[24]

There are a number of other physical traits which are sometimes viewed as undesirable and which therefore have developed euphemisms, a number of them deliberately humorous. For instance, elderly people are now *seniors* or *senior citizens, longer living, mature, chronologically gifted*, or *increasingly distracted* (Leo 1990). Overweight people are no longer *fat* but *horizontally challenged*, this form replacing to some extent such earlier euphemisms as *pleasingly plump, big-boned, stocky*, and *healthy*. Clothes for such people are often *size friendly* (Hemenway 1991) or *generously cut* (Fury 1991).

Other conditions and character traits of various sorts have also been euphemised. The *poor* are now referred to as *differently advantaged*, a poor speller is now *orthographically challenged* (Beard & Cerf 1993:17, 51), and someone who is nearsighted or farsighted is *optically inconvenienced* or *optically challenged* (Trudeau 1991). A lazy person is *motivationally deficient* or *motivationally dispossessed* (Dickson 1990:50) and when driving if you encounter a *stupid idiot* you should call him or her a *knowledge-base nonpossessor* (Lutz 1990:63).

V. MANIPULATIVE LANGUAGE. The area in which PC language has perhaps had its most pervasive effect is in the replacement of terms referring to unpleasant or suspicious activities or events in such a way that the acts seem to be much more innocuous than they really are. For example, *shrinkage* is a term that retailers use to refer to *shoplifting*, which itself is a euphemism for *stealing*, a crime the incidence of which has increased dramatically in recent years (Ecenbarger 1996:100). We see here a good example of how euphemisms can contribute to moral relativism in our society—if it doesn't **sound** so bad it must not **be** so bad.

This phenomenon also occurs in a large number of terms used by the military: *fire for effect* or *neutralize* (Rawson 1981:4) for *kill, strategic withdrawal* for *retreat* (Neaman & Silver 1991:334), *air support* (Neaman & Silver 1991:351) or *armed reconnaissance* (Rawson 1981:20) for *bombing, incontinent ordnance* (Black 1991) or *friendly fire* (Commager 1972) for bombs, missiles or shells that fall on one's own position, *collateral damage* for civilian deaths or injuries or damage to civilian property caused by a military attack (Black 1991:390), *preemptive strike*, which is Pentagonese for a *sneak bombing attack* (Pei 1973:99), and *engage the enemy on all sides*, which is the U.S. Department of Defense term for *get ambushed* (Lutz 1990:176). Bombing or other attacks on humans (or so-called *soft targets*) are carried out with *soft ordnance* (Rawson 1981:263), that is *antipersonnel weapons* (another euphemism for weapons specifically designed for use against humans). Other governmental euphemisms include such things as the U.S. State Department's *arbitrary deprivation of life* to describe *murder* carried out by friendly governments,[25] and the Central Intelligence Agency's *health alteration*, as in their *health alteration committee*, which is the CIA's assassination unit (Rawson 1981:91–92). When 7 million chickens were gassed in Pennsylvania in 1983 in an effort to contain an outbreak of influenza the U.S. Government referred to the act as *depopulation* (Lutz 1990:213). The Beaumont, Texas, Housing Authority coined the eminently useful term *nonminority impacted* meaning *white only* (*The Quarterly Review of Doublespeak* April 1990:7), while the U.S. Environmental Protection Agency refers to its *enforcement personnel* as *compliance assistance officers* (Lutz 1990:215).

The air and space industry has contributed its share of euphemisms as well. When the space shuttle *Challenger* blew up killing all aboard the *accident* was referred to by a NASA spokesperson as an *anomaly*, and an *anomaly investigation* was carried out. In news conferences regarding the incident, NASA officials referred to the coffins of the astronauts who were killed as *crew transfer containers* (Lutz 1990:222-23). A *near midair collision* is referred to as an *operational error*, and *airline crashes* have been referred to by the National Transportation Safety Board as *controlled flight into terrain* or *failure to maintain clearance from the ground* (Lutz 1990:215). National Airlines referred to the crash of one of its planes as 'the involuntary conversion of a 727' (Lutz 1990:4). The Federal Aviation Administration explained a fatal helicopter crash due to the loss of a rotor as being caused by an *uncontained blade liberation* (Lutz 1990:213). This type of manipulation of opinion or thought through the use of euphemistic language is widespread in political and media circles as well.

VI. RESULTS OF THE PC MOVEMENT. The result of all the emphasis on politically correct language in society today is that many people have felt pressured to use the new terms even when they see no need to or do not agree with the philosophy behind them. A case in point is the recent reworking of the hymnals in a number of the mainline churches in America. These include such denominations as United Methodist, United Church of Christ, Disciples of Christ, Covenant, and others. The changing of familiar words in hymns imposes on people language that reflects particular views with which individual church members may not agree. Last year Marvin Ching presented a paper at LACUS on some of the changes that were made in the new edition of the United Methodist Hymnal (Ching 1996). In a brief examination of the recently released new edition of the hymnal of the Christian Church (Disciples of Christ), the *Chalice Hymnal*, I found similar changes. In the Preface to the hymnal, the editors state on behalf of the fifteen-member hymnal development committee, 'some hymn texts have been amended to eliminate or reduce archaic language, generic masculine references for humanity, and the negative use of metaphors about darkness or physical disabilities'. But these are not all the changes they have made. *God* is still referred to as *Father* on occasion, but often the wording is changed, as in the suggested alternate title for 'Dear *Lord* and *Father* of *Mankind*', which is 'Dear *God*, Embracing *Humankind*'. In the hymn 'Come Thou Almighty King', the line '*Father* all glorious' becomes '*one God* all glorious', and the title of 'God of *Our Fathers*, Whose Almighty Hand' has been changed to 'God of *the Ages*, Whose Almighty Hand'. On the other hand there has been no change in the title of 'This Is

My Father's World', but in this hymn and most others *He, His,* and *Him* in reference to God have been changed wherever possible. For instance the line 'in the rustling grass I hear *Him* pass; *He* speaks to me everywhere' has been changed to 'in the rustling grass I hear *God* pass *who* speaks to me everywhere'. One surprising type of change is the effort to delete references to Jesus as male. For instance, in 'A Mighty Fortress Is Our God' the line '*were not the right man* on our side, the *man* of God's own choosing' has been totally changed to read '*but there is one who takes* our side, the *one* of God's own choosing'. References to God's *kingdom* are changed as well. In the same hymn 'God's truth abideth still, *His kingdom* is forever' appears as 'God's truth abideth still, God's reign endures forever'. In an effort to avoid color references which equate whiteness (and by extrapolation white skin) with goodness, and darkness (and therefore dark skin) with evil, 'This Is My Father's World' was changed so that the line 'the morning light, *the lily white,* declare their maker's praise' became 'the morning light, *the flowers bright,* declare their maker's praise', and in 'Joyful Joyful We Adore Thee' the line 'drive *the dark of* doubt away' was replaced with 'drive *our fear and* doubt away'. Nevertheless a reference to Satan in 'A Mighty Fortress Is Our God' was not changed in the way we might expect—'the *prince of darkness* grim' was changed to 'the *powers of darkness* grim'. Here *darkness* was kept, and the change to *powers* seems to have been made in order to allow the later references to Satan as *he* to be changed to avoid making a gender choice. References to the church as *she* and *her* have also been changed.

THE EXAMPLES GIVEN in this paper illustrate some of the extremes of political correctness in language and the potential for abuse. The insidious thing about much PC language is that people are having politically correct language and attitudes forced upon them whether they like it or not. In many cases they may not even be consciously aware of it. But the result is the same—thoughts and attitudes are being manipulated. As long as the changes are uncontroversial (who can object to the need to be sensitive to the plight of those who are handicapped, for instance), then no harm is done. But when such language is used to promote the political or moral or religious agenda of certain individuals, then we are in dangerous waters. If we blindly go along with the movement in the impression that we are being broad-minded or fair, or because we don't want to make waves or are hesitant to stick our necks out, this amounts to shirking our duty as linguists. If we do not speak up, who will?

In fact, the attempts at thought control manifested in some PC language are reminiscent of Newspeak in George Orwell's 1949 book *1984*. In the book Syme explains his work on the Newspeak dictionary in the following way: 'You think, I dare say, that our chief job is inventing new words. But not a bit of it! We're destroying words—scores of them, hundreds of them, every day. We're cutting the language down to the bone... It's a beautiful thing, the destruction of words. Of course the great wastage is in the verbs and adjectives, but there are hundreds of nouns that can be got rid of as well. It isn't only the synonyms; there are also the antonyms. After all, what justification is there for a word which is simply the opposite of some other word? A word contains its opposite in itself... Don't you see that the whole aim of Newspeak is to narrow the range of thought? In the end we shall make thoughtcrime literally impossible, because there will be no words in which to express it. Every concept that can ever be needed will be expressed by exactly *one* word, with its meaning rigidly defined and all its subsidiary meanings rubbed out and forgotten... Every year fewer and fewer words, and the range of consciousness always a little smaller... The Revolution will be complete when the language is perfect... The whole climate of thought will be different. In fact there will be no thought, as we understand it now. Orthodoxy means not thinking—not needing to think. Orthodoxy is unconsciousness'. (pp. 45–47).

In the afterword to his 1979 book *Fahrenheit 451* Ray Bradbury wrote of the book burning that occurred in the novel: 'The point is obvious. There is more than one way to burn a book. And the world is full of people running about with lit matches. Every minority, be it Baptist/Unitarian, Irish/Italian/Octogenarian/Zen Buddhist, Zionist/Seventh-Day Adventist, Women's Lib/Republican, Mattachine/Four Square Gospel feels it has the will, the right, the duty to douse the kerosene, light the fuse... Fire-Captain Beatty, in my novel *Fahrenheit 451*, described how the books were burned first by minorities, each ripping a page or a paragraph from this book, then that, until the day when the books were empty and the minds shut and the libraries closed forever'. (p. 176).

As linguists, let us take an interest in so-called politically correct language. Let us speak out on the subject, making people aware of both its positive and its negative effects. Shakespeare has said 'That which we call a rose by any other name would smell as sweet'.[26] But perhaps we would do better to listen to Gertrude Stein who has declared 'A rose is a rose is a rose'.[27] I close, however, with Robert A. Hall's admonition of many years ago—'leave your language alone!'[28]

[1] Consider, for example, the *appendix probii*, a commentary by a contemporary Latin scholar on the 'mistakes' in Classical Latin that people of the era were making and which ultimately resulted in what we now call Vulgar Latin. This document, listing some 300 items, has given us valuable contemporary evidence of the changes that Latin was undergoing during that period.

[2] Notice the politically incorrect use of *his* in this sentence.

[3] Quoted in *Reader's Digest*, December 1995, p. 146.

[4] *The San Diego Union-Tribune*, August 2, 1992. Cited in *The Quarterly Review of Doublespeak*, April 1993, p. 5.

[5] *The New England Journal of Medicine*, August 18, 1988. Cited in *The Quarterly Review of Doublespeak*, January 1989, p. 9.

[6] Faith Donne, professor of education at Dartmouth College, quoted in Lambert 1991.

[7] Defined in the *Random House Webster's College Dictionary* (1991:628) as 'History (used as an alternative form to distinguish or emphasize the particular experience of women)'. The term is defined in *A Woman's New World Dictionary* (Lennert & Willson 1973), cited in *A Feminist Dictionary* (Kramarae & Treichler 1985:190), as '1. The past as seen through the eyes of women. 2. The removal of male self-glorification from history'.

[8] A term coined by *The Flame* magazine and cited in Kramarae and Treichler (1985:203).

[9] Created by feminist writer Mary Orovan and cited in Pei (1973:56).

[10] Cited in *The Quarterly Review of Doublespeak*, October 1991, p. 4.

[11] Used by a Fort Lauderdale, Florida, defense attorney as reported in *The Toronto Sun*, September 6, 1991, and quoted in *The Quarterly Review of Doublespeak*, April 1992, p. 9.

[12] Landers 1988, cited in *The Quarterly Review of Doublespeak*, July 1989, p. 10. See also Matthews 1991.

[13] See *The Quarterly Review of Doublespeak*, April 1991, p. 3.

[14] In a glaring misunderstanding of the nature of the possessive construction, Val Dumond emphasizes the importance of avoiding such possessives as 'my significant other', stating 'When two people marry one does not become the property of the other; one does not belong to the other' (1990:46).

[15] *Executive Recruiter News*, November 1990.

[16] CBS radio, November 2, 1995.

[17] This term was reportedly coined by Foster City, California, City Councilman John Oliver who, being 'houseless', sleeps in his camper truck. Cited in *The Quarterly Review of Doublespeak*, April 1991, pp. 8–9.

[18] A Swarthmore College training manual (cited in Taylor 1991) defines *acquaintance rape* as 'a spectrum of incidents and behaviors ranging from crimes legally defined as rape to verbal harassment and inappropriate innuendo'.

[19] Cited in *The Quarterly Review of Doublespeak*, Oct. 1992, p. 8.

[20] From an advertisement for *The Animals' Voice* in *The Animals' Agenda*, July/August 1988, inside back cover.

[21] Note the use of the term in the name of the NAACP—the National Association for the Advancement of Colored People.

[22] The advertising flier, for First Midwest Bank, N.A., also refers to 'customers with differing abilities', 'visually challenged individuals', 'sight impaired clients' (who apparently are not the same as those who are 'visually challenged'), and 'hearing impaired individuals' (who can avail themselves of 'a Telecommunications Device for the Deaf [TDD]'). In the midst of all this the ad states that 'foreign language interpreters are also available at various locations, and bilingual customer service representatives are available upon request', apparently equating being a non-native speaker with being 'physically challenged'.

[23] From *TV Guide*, quoted in the 'Personal Glimpses' section of *Reader's Digest*, April 1996, pp. 17–18.

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[24] Timothy Harper in *Sky Magazine*, quoted in the 'Heroes for Today' section of *Reader's Digest*, June 1996, p. 153.

[25] The phrase was coined in 1984 because, according to Assistant Secretary of State Elliott Abrams, 'we found the term "killing" too broad' (Fahey 1990:123).

[26] *Romeo and Juliet*, Act II, Scene 2, Line 43.

[27] In her poem, *Sacred Emily*. This often misquoted line actually reads 'Rose is a rose is a rose is a rose'.

[28] From his 1948 book of the same title.

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INVITED LECTURE

HOW THE BRAIN LEARNS LANGUAGE

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Language processing often seems remarkably effortless. We carry on conversations while we drive a car or while we sew on a button without interfering with either activity. Language learning in children also appears effortless and natural. But this apparent effortlessness presents us with a great puzzle. When linguists look at language learning and processing, they find complexity: rules, categories, and symbols. Yet, the users of language seem blissfully unaware of the complexities of the rules that they are obeying. How can we reconcile this apparent complexity with this corresponding perceived effortlessness? Recently, language researchers from many different backgrounds have begun to explore ways of addressing this paradox. Their answers call into question the extent to which language learning and processing actually function in obedience to an explicit set of formal rules. According to this new view of language learning and processing, the behaviors that we tend to characterize in terms of rules and symbols are in fact emergent patterns that arise from the interactions of other less complex or more stable underlying systems. We will refer to this new viewpoint on language learning and processing as 'emergentism'.

Emergentist accounts have been formulated for a wide variety of linguistic phenomena, ranging from segmental inventories, stress patterns, phonotactic constraints, morphophonological alternations, lexical structures, pidginization, second language learning, historical change, online phrase attachment, and rhetorical structures. Formalisms that have been used to analyze the emergent nature of these forms include connectionist networks, dynamic systems theory, neuronal competition models, classifier systems, production-system architectures, Bayesian models, Optimality Theory, corpora studies, and even hermeneutic analysis.

The basic notion underlying emergentism is simple enough. If you spend time watching the checkout lines at a supermarket, you quickly find that the number of people queued up in each line is roughly the same. At peak times, you may find five or six people in a line waiting to check out. At slower times, lines have only two or three waiting. There is no socially imposed rule governing this pattern. Instead, it emerges from other basic facts about the goals and behavior of shoppers and supermarket managers. Or, to take another example, consider the shape of the cells in a honeycomb. There is nothing in the genetic makeup of the honey bee that determines that each cell in the honey comb should be hexagonally shaped. Rather this shape emerges through the interactions of hundreds of cells in terms of principles of packing functions. Nature is replete with examples of emergence. The form of beaches and mountain ridges, the geometry of snowflakes and crystals, the appearance of *fata morgana* (mirages) in the desert, and the movement of the Jet Stream in the air and the Gulf Stream in the sea—all of these patterns arise from interactions of physical principles with constraints imposed by physical bodies. Even in the biological world, much of our somatic form is emergent, whether it be the patterns of stripes on the tiger, the formation of teeth into a uniform bite, the structuring of enzymes to catalyze organic reactions, or our patterns of fingerprints and hair formations.

BASIC ASSUMPTIONS. In this paper, we want to explore three specific types of emergence that operate during the course of language learning. The first involves the acquisition of basic lexical structures in small areas of cortex that we will call 'local maps'. The second involves the processing of information across longer neural distances in what we will call 'functional neural circuits'. Within local maps, processing is highly automatic and largely capacity free. However, the strict topological structure of local maps makes certain types of new learning difficult. Across areas connected by functional neural circuits, processing is nonautomatic and capacity-restricted. Although this type of processing leads to some instability, it also allows for a certain flexibility in learning. Between the level of the local map and the functional neural circuit, we can distinguish a third level of emergent structure which we will refer to as 'emergent lexical properties'. This third level uses the information implicit in local lexical maps to support alternative grammatical cryptotypes and argument structure frames. (Cryptotypes are linguistic categories that are marked covertly or indirectly by their selection options on some cooccuring marking. For example, verb stativity is marked covertly in English by the possibility of using the the progressive.) In this paper, we will outline ways in which these three levels of neural processing help to support the complex human activity which we call language.

PRINCIPLES OF NEURAL NETWORKS. Connectionist models are implemented in terms of artificial neural networks. Neural networks that are able to learn from input are known as 'adaptive neural networks'. The architecture of an adaptive neural network can be specified in terms of eight design features:

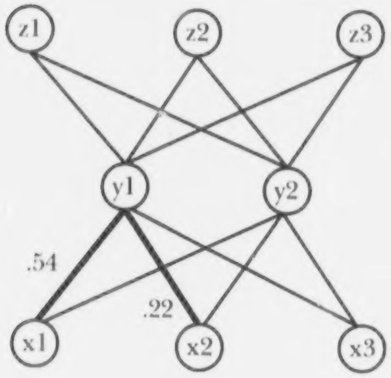


Figure 1. A sample adaptive neural network

1. UNITS. The basic components of the network are a number of simple elements variously called neurons, units, cells, or nodes. In Figure 1, the units are labeled with letters such as 'x_1'.
2. CONNECTIONS. Neurons or pools of neurons are connected by a set of pathways which are variously called connections, links, pathways, or arcs. In most models, these connections are unidirectional, going from a 'sending' unit to a 'receiving' unit. This unidirectionality reflects the fact that neural connections also operate in only one direction. The only information conveyed across connections is activation information. No signals or codes are passed. In Figure 1, the connection between units x_1 and y_1 is marked with a thick line.
3. PATTERNS OF CONNECTIVITY. Neurons are typically grouped into pools or layers. Connections can operate within or between layers. In some models, there are no within-layer connections; in others, all units in a given layer are interconnected. Units or layers can be further divided into three classes:
    - a. Input units which represent signals from earlier networks. These are marked as 'x' units in Figure 1.
    - b. Output units which represent the choices or decisions made by the network. These are marked as 'z' units in Figure 1.
    - c. Hidden units which represent additional units juxtaposed between input and output for the purposes of computing more complex, nonlinear relations. These are marked as 'y' units in Figure 1.
4. WEIGHTS. Each connection has a numerical weight that is designed to represent the degree to which it can convey activation from the sending unit to the receiving unit. Learning is achieved by changing the

weights on connections. For example, the weight on the connection between x_1 and y_1 is given as .54 in Figure 1.

5. NET INPUTS. The total amount of input from a sending neuron to a receiving neuron is determined by multiplying the weights on each connection to the receiving unit times the activation of the sending neuron. This 'net input' to the receiving unit is the sum of all such inputs from sending neurons. In Figure 1, the net input to y_1 is .76, if we assume that the activation of x_1 and x_2 are both at '1' and the x_1y_1 weight is .54 and the x_2y_1 weight is .22.
6. ACTIVATION FUNCTIONS. Each unit has a level of activation. These activation levels can vary continuously between '0' and '1'. In order to determine a new activation level, activation functions are applied to the net input. Functions that 'squash' high values can be used to make sure that all new activations stay in the range of '0' to '1'.
7. THRESHOLDS AND BIASES. Although activations can take on any value between '0' and '1', often thresholds and bias functions are used to force units to be either fully 'on' or fully 'off'.
8. A LEARNING RULE. The basic goal of training is to bring the neural net into a state where it can take a given input and produce the correct output. To do this, a learning rule is used to change the weights on the connections. Supervised learning rules need to rely on the presence of a target output as the model for this changing of weights. Unsupervised learning rules do not rely on targets and correction, but use the structure of the input as their guide to learning.

All connectionist networks share this common language of units, connections, weights, and learning rules. However, architectures differ markedly both in their detailed patterns of connectivity and in the specific rules used for activation and learning. For excellent, readable introductions to the theory and practice of neural network modeling, the reader may wish to consult Bechtel and Abrahamsen (1991) or Fausett (1994). For a mathematically more advanced treatment, see Hertz, Krogh, and Palmer (1991).

LOCAL LEXICAL MAPS. Nothing is more basic in language than the learning of new words. The child's first word often appears toward the beginning of the second year of life. But word learning is not a sudden process. Rather, it depends on a whole range of experiences and activities in which the child participates during the first year of life. Some of this experience involves producing nonconventional sounds through babbling. Another type of experience involves listening to the cadences and phonetic forms of the words used by the adult community. Still another type of experience involves the slow development of thinking about the various categories of objects and events in the natural world. All of these activities and experiences are prerequisites to the learning of the first words. About two or three months before the first productive words are produced, we find some evidence that the child has begun to acquire a passive comprehension of a few of the most common words of the language. For example, the 14-month-old who has not yet produced the first word may show an understanding of the word *dog* by turning to a picture of a dog, rather than a picture of a cat, when the word *dog* is uttered. It is difficult to measure the exact size of this comprehension vocabulary in the weeks preceding the first productive word, but it is perhaps no more than 20 words in size.

During this early period of auditory learning, the child starts to form associations between certain auditory patterns and particular meaningful interpretations. In older models of lexical learning, the process of associating a sound with a meaning involved the trivial formation of a single link. For example, in Morton's (1970) Logogen Model, the learning of a new word requires nothing more than the linking up of one already available pattern or cluster to another. The idea that auditory and semantic patterns form coherent clusters does seem to reflect real facts about the infant's cognition. On the semantic level, one could argue (Mervis 1984) that the child's previous experience with dogs has served to promote the consolidation of the concept of a 'dog'. On the phonological level, it appears that repeated exposure to the consistent pattern of *dog* also leads to the emergence of a consolidated phonological pattern.

The self-organizing feature map (SOFM) framework of Kohonen (1982) and Miikkulainen (1990; 1991) provides us with a way of characterizing these early processes of semantic and phonological consolidation. In the framework of SOFM models, word learning can be viewed as involving the development of maps in which individual patterns can be stored and retrieved reliably. For word learning, three types of local maps are important: auditory maps, meaning maps, and articulatory maps. Each of these three maps has a similar structure. Figure 2 illustrates the activation of a particular node in an auditory map.

The input to this feature map involves a large number of auditory phonological features taken from separate domains such as sibilance, formant transition direction, formant duration, formant frequency, stop click timing, and others. These are schematically represented as 'auditory features' at the bottom of Figure 2. For the purposes of computational modelling, this rich multidimensional space can be compressed onto a 2-D topological space. The two dimensions of the graphic representation do not have any direct relation to features in the input data set. However, the learning algorithm works to preserve the topological relations inherent in the high-dimensional space. By itself, a map of the type given in Figure 2 does not model the full learning of a

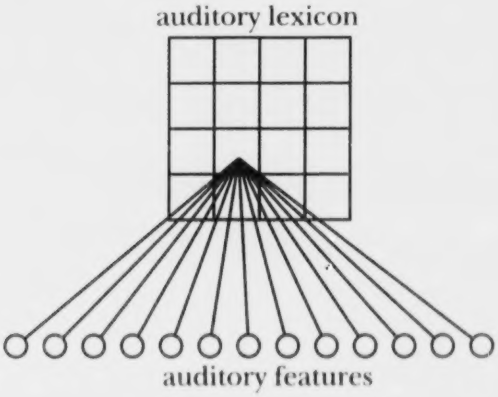


Figure 2. A self-organizing feature map for storing auditory patterns

word; it only encodes the possible auditory forms to which the child has been exposed.

What makes this mapping process self-organizing is the fact that there is no pre-established pattern for these mappings and no preordained relation between particular nodes and particular feature patterns. The SOFM algorithm decides which node on the map should be the 'winner' for a particular input pattern. At first, the weights on the map are set to small random values. When the first input comes in, the random setting of these weights make it so that, by chance, some particular node is the one that is maximally responsive to the current input pattern. That node then decrements the activation levels on the other nodes. However, the shape of this decrementation takes on the form of a 'Mexican hat' or sombrero. Right around the winner, related nodes are not decremented as much as are more distant nodes. Because of the architecture of the relation between the input and the grid, nodes that are nearby in the map come to respond to similar input patterns. For example, words that begin with similar initial segments will tend to be assigned to neighboring units in the map. The Mexican hat shape obeyed by the competitive interactions in the SOFM conforms closely to known facts about lateral inhibition and the redistribution of syntactic resources (Kohonen 1982) in cortical tissue. The actual computational implementation of this framework uses a computationally efficient algorithm that is faithful to these biological principles (Miikkulainen 1990).

This system works well to encode large numbers of patterns. In one example simulation, we found that a 100 x 100 network with 10,000 nodes can learn up to 6000 phonological patterns with an error rate of less than 1%. In this implementation, we used eight floating-point numbers to generate the input. At the beginning of learning, the first input vector of eight numbers led by chance to somewhat stronger activation on one of the 10,000 cells. This one slightly more active cell then inhibits the activation of its competitors, according to the Mexican hat function. As a result of this pattern of activation and inhibition, inputs that are close in feature space end up activating cells in similar regions of the map. Once a cell has won a particular competition, its activation is negatively damped to prevent it from winning for all of the inputs. Then, on the next trial, another cell has a chance to win in the competition for the next sound-meaning input pattern. This process repeats until all 6000 sound-meaning patterns have developed some 'specialist' cell in the feature map. During this process, the dynamics of self-organization make it so that items with shared features end up in similar regions of the feature map.

We tracked the development of the feature map by computing the average radius of the individual items. After learning the first 700 words, the average radius of each word was 70 cells; after 3000 words, the radius was 8; after 5000 words the radius was 3; and after 6000 words the radius was only 1.5 cells. Clearly, there is not much room for new lexical items in a feature map with 10,000 cells that has already learned 6000 items. However, there is good reason to think that the enormous number of cells in the human brain makes it so that the size of the initial feature map is not an important limiting constraint on the learning of the lexicon by real children. We have found that there is no clear upper limit on the ability of the SOFM to acquire more items, when it is given a larger dimensionality.

USING MAPS FOR RETRIEVAL. In order to permit full use of the lexicon in processing, the basic SOFM architecture must be supplemented by additional connections. Miikkulainen (1990) did this by training reciprocal connections on two maps using Hebbian learning. Figure 3 illustrates the relations of these two maps. In this figure, a particular auditory form is associated with a particular semantic form or meaning.

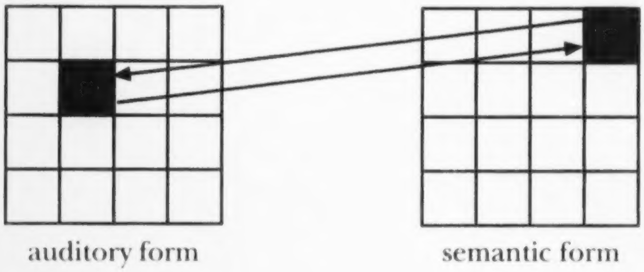


Figure 3. A bidirectional sound-meaning association in a feature map

Neuronal connections can only fire in a single direction. However, we want to have bidirectional connections between sounds and meanings. In order to establish a bidirectional association between an auditory pattern and a particular semantic pattern, training has to be conducted separately in each direction. In our simulations, learning begins with the consolidation of both the auditory and semantic maps according to the SOFM competitive learning algorithm. Once patterns are established on the two basic maps, Hebbian learning strengthens connections between units that are coactive on the sound map and the meaning map. This training is intended to represent the actual process of word learning, during which the child hears a word at the same time some meaningful aspect of the environment is being focused upon.

This proposed model is oversimplified in terms of both structure and process. In structural terms, additional maps are needed to represent additional aspects of lexical knowledge. In addition to the two maps given in Figure 3, there must be a map that encodes output phonological form, since the child must not only associate an auditory form to a semantic form but must also associate the auditory form to an articulatory form and an articulatory form to the semantic form. Later, when the child learns to read and spell, there will also be maps for orthographic and visual forms. In processing terms, the SOFM given in Figure 3 fails to express important aspects of the serial structure of auditory and articulatory patterns. Later, we will discuss a lexical learning model developed by Gupta and MacWhinney (1996) that deals in a more explicit way with issues of serial ordering.

ARTICULATORY SCAFFOLDING. The relation between a pattern in the auditory map and a pattern in the semantic map is essentially arbitrary. There is nothing about the phonological shape of /kæt/ that corresponds in some patterned way to the meaning 'cat'. However, the relation between auditory and articulatory forms is far more systematic. Once an adult has been exposed to a new auditory form, the corresponding articulatory form is extremely easy to produce. When we hear someone say that their last name is 'Tomingo' we can quickly reproduce that name, even after only one trial.

For the child, the mapping from a new auditory form to an articulatory form is a bit more difficult, but it is still the case that audition serves to 'scaffold' articulation. What this means is that the auditory form remains an active target as we attempt to match the form in articulation. By then listening to our articulation, we can verify the match of our output to the target auditory form. This allows us to correct errors and to set up an excitatory feedback loop between the two forms that stabilizes the new articulatory shape. Gupta and MacWhinney (1996) show how the development of this correspondence is based primarily on the mapping of correspondences between auditory fragments and articulatory fragments. In the simplest case, these fragments are syllables. For example, once the child has learned how to produce the syllable /go/ of *go*, this auditory-articulatory correspondence is available for use in any new word. Even individual segments can be extracted through analysis. Some of this learning occurs during late babbling, but it is consolidated with the first words. Over time, the links between auditory and articulatory forms become more extensive.

PROSODY AND TIME. Both the auditory and the articulatory maps must be structured to deal effectively with multisyllabic patterns. A major limitation of some earlier connectionist models (MacWhinney, Leinbach, Taraban & McDonald 1989) was their reliance on a grid-based representation for words that required preallocation of a fixed number of syllables. For example, the word *banana* would require three fully specified sets of nodes for each of the three syllables. Within each syllable, the complete mechanism for specifying the features of the onset, nucleus, and coda would have to be repeated. In order to extend the system to deal with a four-syllable word such as *rhinoceros* a whole new set of identical units would then have to be grafted onto the system.

Systems like NetTalk (Bullinaria 1996; Sejnowski & Rosenberg 1988) or recurrent networks (Dell, Juliano & Govindjee 1993; Elman 1990) deal with the processing of temporal information by imposing an attentional focus that moves across the incoming word left-to-right in time. These systems try to interpret the sound of each letter or phoneme with only a little attention to surrounding context. One major strength of this type of system is the fact that it avoids repetitive encoding of phonological information for different positions in the word. However, like the slot-based approach mentioned above, these systems need to preallocate a certain number of positions in the input space. Words that exceed this length cannot be processed.

An alternative to these systems uses a SOFM to encode individual incoming syllables. This system deals with the problem of having to duplicate phonological knowledge by repeatedly using the same basic syllable processing map. This map stores a large number of identifiable syllabic forms such as /ba/, /kib/, and /ʊv/, as well as subsyllabic forms such as /s/ or /n/. The input to this SOFM arrives in a sequential way, but each syllable is processed as a separate temporal chunk. This is easy to do on the level of the syllable because there are many cues that tell whether a segment is in the position of the onset, the nucleus, or the coda. Because most coarticulation effects occur within the syllable, this is an effective way of dealing with low-level context effects. The syllabic processor operates repeatedly through the word to encode a series of activations of syllables.

The functioning of this syllabic map is supplemented by a process that associates particular syllabic vectors with additional prosodic information. This processor attends not to the segmental forms in the speech wave but to the overall prosodic structure. Prosodic information works in terms of the system of metrical feet to encode the status of a given syllable as being in a iambic or trochaic foot and being either a strong or weak syllable. It is the union of these prosodic features with the basic segmental syllabic features which then serve as input to the auditory lexical SOFM. In a word like 'banana' the syllabic processor operates repeatedly to encode three syllables. However, without the additional metrical information, these three encodings could be perceived as the patterns *nabana* or *nanaba*, as well as *banana*. In order to uniquely encode 'banana', the first syllable /ba/ must be coded as a first foot weak beat, the second syllable /na/ must be coded as the strong beat and the final /na/ must be coded as the second foot weak beat. Thus, the complete input to the lexical map includes both segmental and prosodic information. It is this complete merged pattern which is then associated to the semantic pattern to specify emergent lexical items.

EMERGENT LEXICAL PROPERTIES. Lexical items provide a substrate that can lead to the emergence of a variety of complex linguistic structures. The force that drives this structural emergence is the linking of words into syntactic combinations. We will call the properties that emerge from the combinations of words 'emergent lexical properties'. When words are combined into phrases and sentences, there are a variety of complex interactions that arise in terms of phonology, grammatical relations, and meaning. In this section we will review some of these interactions.

ACQUIRING INFLECTIONAL MORPHOLOGY. The local lexical map can be used to acquire both stems such as *dog* or *jump* and affixes such as the plural suffix or the past tense suffix. Stems can be learned directly. However, in order to model the learning of affixes, we need to examine an additional process called 'masking' (Burgess 1995; Burgess *&* Hitch 1992; Carpenter, Grossberg *&* Reynolds 1991; Cohen *&* Grossberg 1987; Grossberg 1987). Let us use the learning of the English past tense suffix to illustrate how masking works.

1. The net learns a set of present tense verbs, along with the corresponding past tense forms. We can refer to this initial phase of learning as 'rote' learning. These rote-learned forms include regular pairs such as *jump~jumped* and *want~wanted*, as well as irregulars such as *run~ran* and *take~took*.
2. The network then learns a new present tense such as push for which the corresponding past tense form has not yet been learned.
3. Then the child hears the word *pushed* with the auditory form /pušt/ and the semantic pattern 'push + past'. On the auditory map, the

node corresponding to /puš/ is the closest match. On the semantic map, the node corresponding to 'push + present' is the closest match.

4. A pattern of bidirectional activation is established between the two maps. It is this bidirectional activation that supports the process of 'masking'. Masking works to drain activation from nodes and features that are coactive in the two maps. In the current example, the features of the stem on both maps are all masked out, leaving the feature 'past tense' as unmasked on the semantic map and the features corresponding to the final /id/ as unmasked on the auditory map.
5. The unmasked phonology is then associated with the unmasked semantics through the same type of Hebbian learning that is used to produce the basic rote-learning of new lexical forms.

This implements in a neuronally plausible way the process of morphological extraction by analysis. In the terms of MacWhinney (1978), affix analysis involves associating the 'unexpressed' with the 'uncomprehended'. This approach to the problem of learning the English past tense solves a number of problems faced by earlier nonlexical models. First, the model succeeds in capturing both rote lexicalization and combinatorial lexicalization within a single connectionist model. Rote forms are picked up directly on the feature map. Combinatorial forms are created by the isolation of the suffix through masking and the use of masking in production.

Having learned to comprehend the past tense in a productive way, the child can then learn the association between the auditory pattern and an articulatory representation. This occurs when the child tries to produce the new form. The activation of a semantic pattern leads to the activation of an auditory pattern which then sets up a temporary excitatory feedback loop to the articulatory map. During the process of scaffolding, the auditory form remains active as we attempt to match the form in articulation. By then listening to our articulation, we can verify the match, correct errors, and set up an excitatory feedback loop between the two forms that stabilizes the new articulatory shape. As we noted earlier, the process of developing a match between the auditory and articulatory forms proceeds syllable by syllable (1996) by relying on prosody to encode the temporal properties of successive syllables.

USING INFLECTIONAL MORPHOLOGY. Having acquired productive use of inflectional morphology, the child can begin to learn which forms of each inflection can be used with particular stems in particular cases. The emergentist approach to language acquisition claims that these complex patterns emerge naturally from the interaction of already learned phonological structures in the lexical map. To illustrate how this can work, let us take as an example the model of German gender learning developed by MacWhinney, Leinbach, Taraban, and McDonald (1989). This model was designed to explain how German children learn how to select one of the six different forms of the German definite article. In English we have a single word *the* to express definiteness. In German, the same idea can be expressed by *der, die, das, des, dem,* or *den.* Which of the six forms of the article should be used to modify a given noun in German depends on three additional features of the noun: its gender (masculine, feminine, or neuter), its number (singular or plural), and its role within the sentence (subject, possessor, direct object, prepositional object, or indirect object). To make matters worse, assignment of nouns to gender categories is often quite nonintuitive. For example, the word for 'fork' is feminine, the word for 'spoon' is masculine, and the word for 'knife' is neuter.

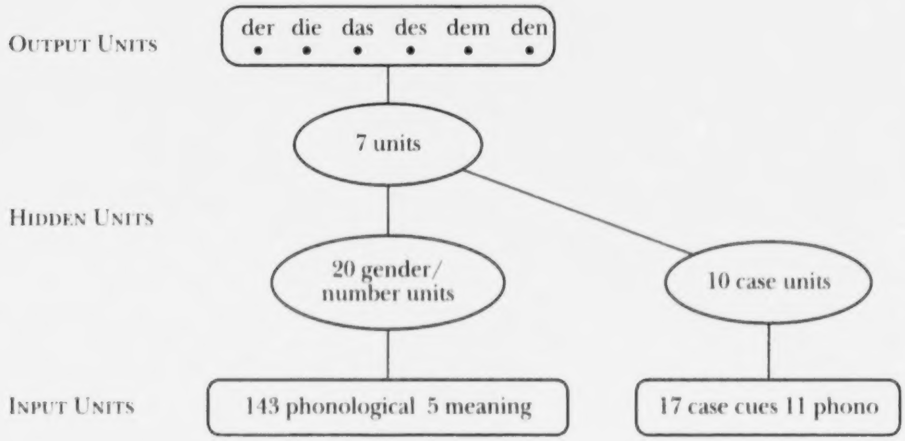


Figure 4. A back propagation model for German declension

Although these relations are indeed complex, MacWhinney et al. show that it is possible to construct a connectionist network that learns the German system from the available cues. The MacWhinney et al. model, like most current connectionist models, involves a level of input units, a level of hidden units, and a level of output units (Figure 4). Each of these levels or layers contains a number of discrete units or nodes. For example, in the MacWhinney et al. model, the 35 units within the input level represent features of the noun that is to be modified by the article. Each of the two hidden unit levels includes multiple units that represent combinations of these input-level features. The six output units represent the six forms of the German definite article.

As noted above, a central feature of such connectionist models is the very large number of connections among processing units. As shown in Figure 4, each input-level unit is connected to first-level hidden units; each first-level hidden unit is connected to second-level hidden units; and each second-level hidden unit is connected to each of the six output units. None of these hundreds of individual node-to-node connections are illustrated in Figure 4, since graphing each individual connection would lead to a blurred pattern of connecting lines. Instead a single line is used to stand in place of a fully interconnected pattern between levels. Learning is achieved by repetitive cycling through three steps. First, the system is presented with an input pattern that turns on some, but not all of the input units. In this case, the pattern is a set of sound features for the noun being used. Second, the activations of these units send activations through the hidden units and on to the output units. Third, the state of the output units is compared to the correct target and, if it does not match the target, the weights in the network are adjusted so that connections that suggested the correct answer are strengthened and connections that suggested the wrong answer are weakened.

MacWhinney et al. tested this system's ability to master the German article system by repeatedly presenting 102 common German nouns. Frequency of presentation of each noun was proportional to the frequency with which the nouns are used in German. The job of the network was to choose which article to use with each noun in each particular context. After it did this, the correct answer was presented, and the simulation adjusted connection strengths so as to optimize its accuracy in the future.

After training was finished, the network was able to chose the correct article for 98 percent of the nouns in the original set. Of course, the ability to learn the input set is not a demonstration of true learning, since the network may have simply memorized each presented form by rote. However, when the simulation was presented with a previously encountered noun in a novel context, it chose the correct article on 92 percent of trials, despite the noun's often taking a different article in the new context than it had in the previously encountered ones. This type of cross-paradigm generalization is clear evidence that the network went far beyond rote memorization during the training phase. In addition, the simulation was able to generalize its internalized knowledge to entirely novel nouns. The 48 most frequent nouns in German that had not been included in the original input set were presented in a variety of sentence contexts. On this completely novel set, the simulation chose the correct article from the six possibilities on 61 percent of trials, versus 17 % expected by chance. Thus, the system's learning mechanism, together with its representation of the noun's phonological and semantic properties and the context, produced a good guess about what article would accompany a given noun, even when the noun was entirely unfamiliar.

The network's learning paralleled children's learning in a number of ways. Like real German-speaking children, the network tended to overuse the articles that accompany feminine nouns. The reason for this is that the feminine forms of the article have a high frequency because they are used both for feminines and for plurals of all genders. The simulation also showed the same type of overgeneralization patterns that are often interpreted as reflecting rule use when they occur in children's language. For example, although the noun *Kleid* (which means clothing) is neuter, the simulation used the initial 'kl' sound of the noun to conclude that it was masculine. Because of this, it invariably chose the article that would accompany the noun if it were masculine. Further, the same article-noun combinations that are the most difficult for children proved to be the most difficult for the simulation to learn and to generalize to on the basis of previously learned examples.

How was the simulation able to produce such generalization and rule-like behavior without any specific rules? The basic mechanism involved adjusting connection strengths between input, hidden, and output units to reflect the frequency with which combinations of features of nouns were associated with each article. Although no single feature can predict which article would be used, various complex combinations of phonological, semantic, and contextual cues allow quite accurate prediction of which articles should be chosen. This ability to extract complex, interacting patterns of cues is a particular characteristic of the back-propagation algorithm.

Despite its successes, this model and a similar model for English (MacWhinney & Leinbach 1991) faced certain basic problems. These problems all arose from the fact that the model assigned no privileged role to words as lexical items. Instead, all learning was based simply on phonological patterns. A clear example of this type of problem arises in the case of the sound /rɪŋ/ which is used for three different verb meanings (to ring a bell, the wring out the clothes, and to ring the city). The past tense forms of these verbs will be *rang*, *wrung*, and *ringed* depending on the meaning of the stem. By itself, the back propagation net cannot solve this type of problem with homophony. However, if the back propagation network is joined to a SOFM, homophony is no longer a problem, because the various homophonic meanings of *ring* are now representationally distinct. When a phonological pattern is activated, the corresponding semantic form is also activated and both are available as input to the back propagation pattern extractor. Gupta and MacWhinney (1992) showed how the addition of lexical information to the back propagation network for German could lead to improved performance

Because this model combines two different architectures, inflectional formations can be produced in several different ways. First, the SOFM can generate both regular and irregular forms by rote. Second, because the SOFM includes affixes along with stems, regular affixation can be produced through combination. Third, the pattern generalization processes found in the back propagation network can help produce irregularizations. For example, the past tense forms *wrung* and *rang* could be produced either directly by rote or by generalization using the back propagation network.

THE LOGICAL PROBLEM–BENIGN CASES. The most important aspect of the network we have been discussing is that fact a single lexical feature map can produce both a rote form like *went* and a productive form like **goed*. The fact that both can be produced in the same lexical feature map allows us to begin work on a general solution to the 'logical problem of language acquisition' (Baker & McCarthy 1981; Gleitman 1990; Gleitman, Newport & Gleitman 1984; Morgan & Travis 1989; Pinker 1984; Pinker 1989; Wexler & Culicover 1980). In the case of the competition between *went* and **goed*, we expect *went* to become solidified over time because of its repeated occurrence in the input. The form **goed*, on the other hand, is supported only by the presence of the combinational *-ed* form. Figure 5 illustrates this competition:

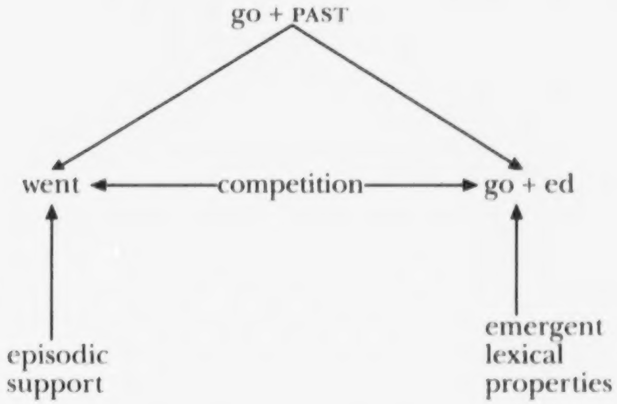


Figure 5. Competition between episodic and combinatorial knowledge.

This particular competition is an example of what Baker (1981) calls a 'benign exception to the logical problem'. The exception is considered benign because the child can learn to block overgeneralization by assuming that there is basically only one way of saying *went*. This Uniqueness Constraint is thought to distinguish benign and non-benign exceptions to the logical problem. However, from the viewpoint of the Competition Model account we are constructing here, all exceptions are benign.

The basic idea here is that, when a child overgeneralizes and produces **goed*, the system itself contains a mechanism that will eventually force recovery. In cases of overgeneralization, alternative expressions compete for the same meaning. One of these forms receives episodic support from the actual linguistic input. This episodic support grows slowly over time. The other form arises productively from the operation of analogistic pressures. When episodic support does not agree with these analogistic pressures, the episodic support eventually comes to dominate and the child recovers from the overgeneralization. This is done without negative evidence, solely on the basic of positive support for the form receiving episodic confirmation.

ARGUMENT FRAME INDUCTION. Earlier versions of the Competition Model (MacWhinney 1988) emphasized the role of lexical argument ('valency' or 'dependency') relations as the basic controllers of syntactic structure. This analysis was in tune with the theories of Lexical Functional Grammar (LFG) (Bresnan 1982) and Head-driven Phrase Structure Grammar (HPSG) (Pollard & Sag 1994) that developed during the 1980s. The role of lexical predicates in determining syntactic structure is now widely accepted. However, there is still no agreement regarding the ways in which children learn to attach argument frames to lexical items or groups of lexical items. Symbolic proposals regarding this learning can be found in MacWhinney (1988), Pinker (1984), and Brent (1994). Within a connectionist framework, the major attempts to deal with syntactic processing include McClelland and Kawamoto (1986), St. John and McClelland (1988), Elman (1990), and Miikkulainen (1993). However, none of these accounts come to grips with the relation between argument frames and specific lexical items.

We know that the induction of argument relations must occur in parallel with the process of learning new words. To illustrate this process, consider an example in which the child already knows the words *Mommy* and *Daddy*, but does not know the word *like*. Given this state of lexical knowledge, the sentence *Daddy likes Mommy* would be represented in this way:

d æ d i	l aɪ k s	m a m i
Daddy	| unknown |	Mommy

For the first and last phonological stretches, there are lexical items that match. These strings and the semantics they represent are masked. The unknown stretch is not masked and therefore stimulates lexical learning of the new word likes. The core of the learning for *likes* is the association of the sound /laɪk/ to the meaning 'like'. In addition to this association, the central association feature map now constructs links not only to sound and meaning, but also to argument relations. The initial argument frame for the word *likes* is:

arg1: preposed, *Daddy*, experiencer
arg2: postposed, *Mommy*, experience

Further exposures to sentences such as *Daddy likes pancakes* or *Billy likes turtles* will soon generalize the dependency frame for *likes* to:

arg1: preposed, experiencer
arg2: postposed, experience

No theoretical weight is placed on the notion of 'experiencer' or 'experience' and different learners may conceptualize this role in different ways.

Adjectives typically have only one argument. Prepositions have two—one for the object of the preposition and a second for the head of the prepositional phrase. Verbs can have as many as three arguments. For each lexical item, we can refer to these arguments as arg1, arg2, and arg3. When a group of words share a common set of semantic relations with a particular argument, they form an argument frame group. For example, words like *send* or *promise* share the syntactic property of permitting a double object construction as in *Tim promised Mary the book.* Pinker (1989) has argued that there are a variety of semantic cues which work together to decide which verbs allow this type of double object construction.

ARGUMENT FRAMES AND THE LOGICAL PROBLEM. Children often produce double object argument frame overgeneralizations such as *I recommended him the book.* Bowerman (1988) and Pinker (1989) argue that, because children do not receive or process negative evidence correcting these errors, the process of recovery constitutes a difficult case of the logical problem of language acquisition. However, in the Competition Model framework, this learning is just as 'benign' as recovery from errors such as **goed.* Figure 6 illustrates the situation:

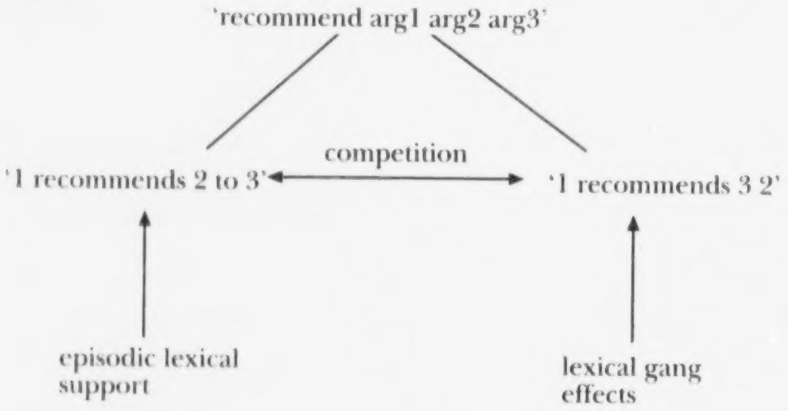
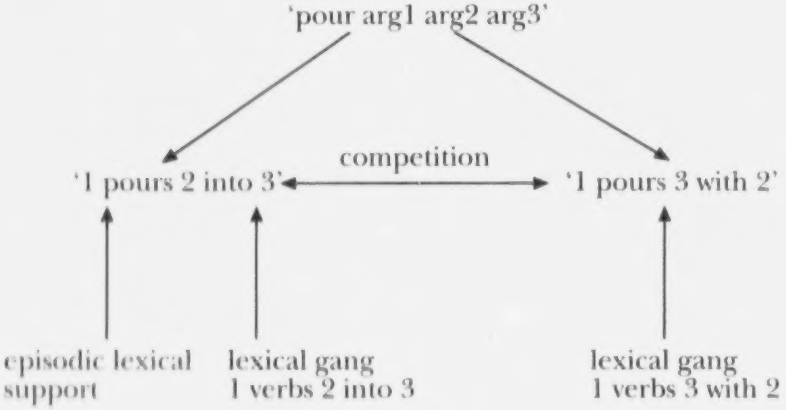


Figure 6. Competition between lexical argument frames and lexical gang effects

In this case, the child receives episodic support for the construction 'X recommends Y to Z'. However, there is also analogistic pressure from the argument frame of words such as *send* or *promise* for the double object argument frame 'X recommends Z Y'. Because the verb *recommend* shares many semantic features with transfer verbs such as *give* and *offer*, it becomes attracted by that lexical gang and is subject to lexical gang effects. In the case of *recommend*, the double object frame is incorrect and receives no episodic support. Over time, the continuing growth of positive episodic support for the prepositional dative form will lead to a decrease in overgeneralizations of the double object form, without any need to invoke negative evidence. Thus, a competitive system of this type learns on the basis of positive evidence.

Perhaps the most complicated form of argument frame competition arises when there are two competing argument patterns. For example, verbs like *pour* or *dump* have a frame in which arg2 is the thing transferred and arg3 is the goal. Thus, we say *Tim poured water into the tub.* Another group of verbs like *fill* or *cover* have a frame in which arg2 is the goal and arg3 is the thing transferred. Thus, we say *Tim covered the lawn with gypsum.*



ARGUMENT FRAMES AND LEXICAL ITEMS. The process of learning argument frames follows the logic developed by Gupta and MacWhinney (1992) for the acquisition of German declensional marking. That model used a SOFM for the extraction of cooccurrence patterns between articles and nouns. Using these patterns, the full shape of the German declensional pattern emerged inside the SOFM. Nodes in the map took on the role of associating particular constellations of case and number marking on the article with one of the three grammatical genders of German. This system was then linked to a backpropagation system that responded to additional phonological cues to gender. The general shape of this type of model is given in Figure 7.

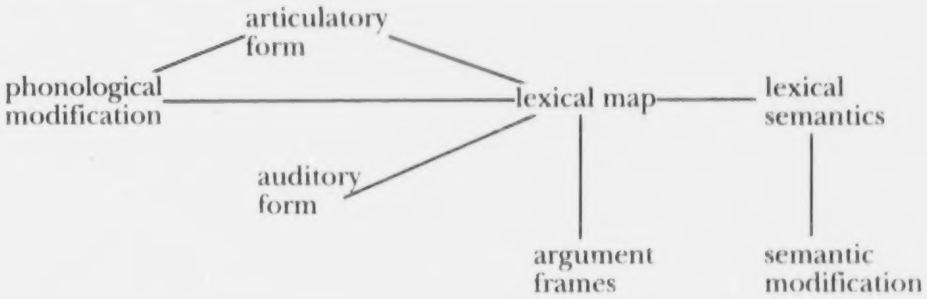


Figure 7. A connectionist account of the lexical knowledge.

The lexical map produces two argument frame effects. One is the activation of the correct argument frame for a specific lexical item. The other is the activation of argument frames for semantically related groups of words or lexical 'gangs'. Words that have similar meanings will tend to activate similar argument structures.

SENTENCE INTERPRETATION. In addition to the basic maps for lexical associations and argument frames, Figure 7 includes systems for phonological and semantic modification. Semantic modification works to adapt meanings when words are linked together. Because connectionist systems are constraint satisfaction systems, rather than rule systems, they can deal with partial violations in the combinations of words. Consider a combination like *another sand.* Typically, the word *another* requires a count noun and *sand* is a mass noun. However, when the listener is confronted with this particular combination, it is still possible to retrieve an interpretation by treating *sand* as a count noun. This can be done by thinking of bags of sand, types of sand, alternative meanings of the word *sand*, or even the act of applying sandpaper to something. MacWhinney (1989) talks about these semantic extension effects in terms of a process of 'pushy polysemy'.

FUNCTIONAL NEURAL CIRCUITS. Pushy polysemy is one of several processes that helps us understand how sentence interpretation arises during online sentence processing. As each predicate is linked to its several arguments, the listener shifts focus away from the individual lexical items onto the emerging sentence interpretation (Gernsbacher 1990; MacWhinney 1977). In effect, every word that is linked to the growing interpretation is 'masked' from the short-lexical memory. However, some syntactic structures place a heavy demand on working memory. For example, in a sentence such as *The dog the cow the pig chased kicked barked*, the listener cannot construct interpretations by linking each word to its neighbor. Instead the string of three nouns and three verbs have to be stored in virtually unassociated form in working memory while the listener attempts to find meaningful clusters. Sentences of this type, while technically grammatical, are notoriously difficult to process. Accumulations of unattached nouns in relative clauses are a well-known problem for speakers of SOV languages such as Hungarian (MacWhinney & Pléh 1988) and Japanese (Hakuta 1981).

Language processing also places demands on general systems for memory storage when we need to remember lists of words (Gathercole & Baddeley 1993; Gupta & MacWhinney 1994). There is now a fair amount of evidence from functional magnetic resonance imagery (fMRI) and positron emission tomography (PET) indicating that word rehearsal places demands on both frontal cortex and superior temporal cortex. Gupta and MacWhinney (1996) argue that the link between frontal and temporal cortex constitutes a functional neural circuit that subserves some of the more difficult, non-lexical aspects of sentence processing.

Recently, we have been studying sentence processing in children with early focal lesions. Despite the fact that large areas of cortex are missing in these children, their basic language abilities are quite normal. Only when we attempt to measure their abilities more closely through more demanding tasks or precise reaction time methodology do we discover important gaps in online processing. This suggests that the basic local encoding of lexical knowledge is maintained in all of these children, and that it is functional neural circuits which are most prone to damage and disorder. Let us look at four example cases.

The 10-year-old subject imaged in Figure 8 has experienced a massive left hemisphere lesion that approximates the loss found in a full hemispherectomy, although major areas of the left frontal area are spared. Despite this massive lesion, his language processing is within the low normal range. However, higher level abilities acquired only later in life, such as reading, are markedly impaired.

The 10-year-old subject whose scan is given in Figure 9 has a clearly discernible left unilateral focal lesion including the supramarginal gyrus of the temporal lobe and the inferior parietal. Her performance lies within the normal to high-normal range on all of our online measures with the exception of the two that require repetition of an auditory signal. On the other hand, she is able to name pictures and remember strings of digits at normal levels. It appears that the lesion to the pathways that connect the posterior auditory area and anterior output phonological processing area in this subject has markedly impaired her ability to repeat words. This is because the repetition task requires the subject to quickly transfer information between these primary phonological processing areas.

Figure 8. Magnetic resonance imaging scan coronal section from Subject #1. Section is taken from center of parietal area. Lesion is in left parietal and temporal cortex. The left hemisphere appears on the right side.

Figure 9. Magnetic resonance imaging scan coronal section from Subject #2. Section is taken from center of parietal area. Lesion is in left superior temporal cortex. The left hemisphere appears on the right side.

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The subject whose scan is given in Figure 10 has an extensive periventricular lesion affecting the anterior parietal. This subject has achieved low normal levels in all of our basic processing tasks. Moreover, he scored quite high on the PPVT. On the other hand, he scored particularly low on the grammatical subtests of the CELF and performed at a low age level in our two online grammatical interpretation tasks. Thus, he illustrates a pattern of some below-normal language skills and others that are well above normal.

The subject whose scan is given in Figure 11 has a clear left focal lesion in the area of the frontal lobe just anterior to Broca's area. His basic PPVT and Leiter scores are normal, but his auditory choice reaction times and his naming reaction times are slow, suggesting an expressive slowdown. He also had low scores on the subtest of the CELF that requires subjects to formulate and complete sentences. This would seem to echo the interpretation of this brain area as related to expressive disorders.

CONSERVATISM, FUNCTIONAL CIRCUITS, AND THE LOGICAL PROBLEM. Although we have emphasized the extent to which lexical competition can solve the logical problem of language acquisition, there are certain complex syntactic structures for which the lexical solution is more questionable. For example, O'Grady (1987) notes that children learn these positive contexts for wh-movement in this order:

What did the little girl hit __ with the block today?
What did the boy play with __ behind his mother?
What did the boy read a story about __ this morning?

Although one might be able to formulate a lexical basis for the processing of these wh-movement patterns, it is more likely that they involve a form of sentence memory that relies rather more on functional neural circuits and less on lexically-organized information. What is interesting is the fact that, precisely in these non-lexical contexts, children's tendency toward conservatism seems to be maximized. Children are never presented with contexts such as this:

*What did the boy with ___ read a story this morning?

Because children approach the learning of these contexts conservatively, they seldom or never make overgeneralizations of this type and never attempt wh-movement in this particular context. Because of this conservativism, attribution of these acquisitional patterns to innate knowledge of a condition blocking subjacency violations seem to be unmotivated.

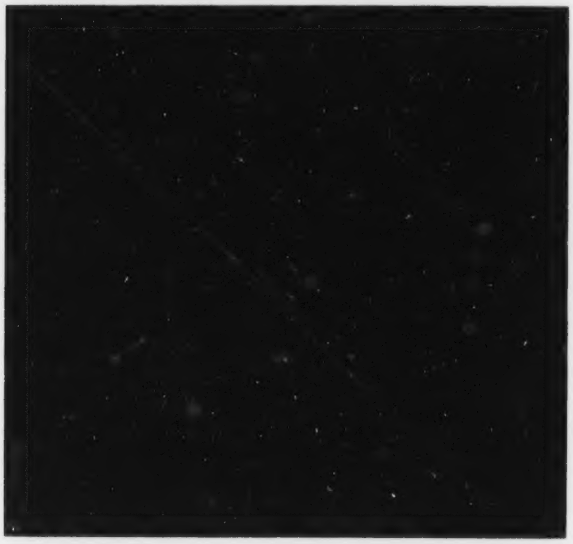

Figure 10. Magnetic resonance imaging scan coronal section from Subject #3. Section is taken from center of parietal area. Lesion is in the area around the left ventricle. The left hemisphere appears on the right side.

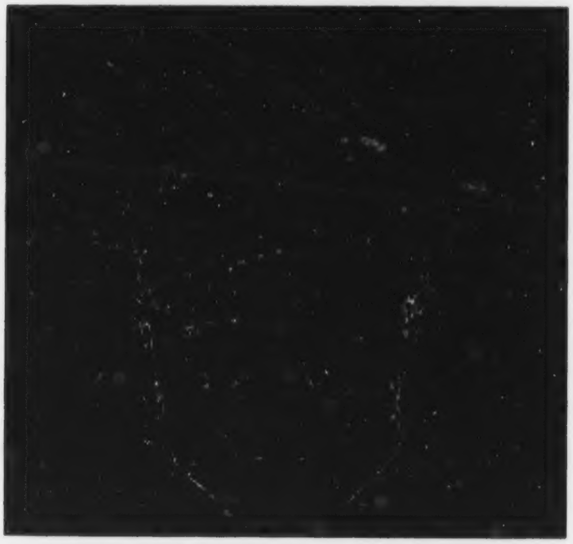

Figure 11. Magnetic resonance imaging scan coronal section from Subject #4. Section is taken from prefrontal area. Lesion is in the area anterior to Broca's area. The left hemisphere appears on the right side. The blurring in the scan is from movement artifact.

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SUMMARY. At this point, it may be useful to summarize the core assumptions being made in this emergentist account of how the brain learns language.

1. The model assumes an auditory processing mechanism that can extract information regarding the onset, nucleus, and coda elements of individual syllables.
2. The information from the syllabic processor is supplemented by information from the prosodic processor which marks the position of each syllable in terms of feet and beats.
3. Auditory and semantic information about words is encoded in a self-organizing feature map.
4. Associations between sound and meaning are formed through Hebbian learning.
5. Auditory information can be used to scaffold the construction of an articulatory representation. This is done in terms of syllables and prosodic structures.
6. Masking in lexical recognition provides the support for the extraction of new affixes.
7. Changes in stems and affixes can be controlled through a system of modifications using the back propagation algorithm.
8. Sentence interpretation requires the linking of words in terms of argument structures. These structures are learned through frame generalization and are pegged to items in the lexical map.
9. The processing of complex syntactic structures and lists of words requires the involvement of functional neural circuits including frontal attentional processing and temporal lobe verbal memory and rehearsal.

In this model of language development, the first commitment that the brain makes is to the encoding of auditory, articulatory, and lexical information in localized maps. After this information is consolidated, back propagation systems develop to fine tune the interactions of lexical items and functional neural circuits control capacity-intensive aspects of sentence processing.

Although the developments we have discussed lead to a great complexity of patterns and constructions, the underlying elements of feature maps, masking, argument frames, and rehearsal loops from which these patterns emerge are themselves fairly simply structures grounded in basic properties of neural structure and functioning. Some aspects of these structures are probably basic to all of mammalian cognition. However, the great elaboration of lexical structures that we find in human language point to the extensive elaboration of earlier structures during the million years of human evolution. Most recently, the overlay of functional neural circuitry between areas such as the frontal attentional areas and the temporal auditory areas has led to further species-specific advances in the capacity for learning and using language. Hopefully, the continuing rapid advances in our understanding of brain function and structure will allow us to move forward rapidly in elaborating this emergentist account of how language is learned by the brain.

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INVITED LECTURE

SOME GRAMMATICAL EVIDENCE FOR EURASIATIC, ESPECIALLY PRONOMINAL

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IN GREENBERG (1987:332) a family of languages, Eurasiatic, is proposed with the following membership: Indo-European, Uralic, Yukaghir, Altaic (Turkic, Mongolian, Tungusic), Korean, Ainu, Japanese, Gilyak, Chukotian and Eskimo-Aleut. Of these Korean, Ainu and Japanese probably form a subgroup.

It is natural to ask what the relationship is between the Nostratic hypothesis of the Moscow school and Eurasiatic as just outlined. What might be called 'classical' Nostratic consists of the six language groups contained in Illich-Svytich's comparative dictionary, namely Indo-European, Afroasiatic, Khartvelian, Dravidian, Uralic and Altaic. It should also be noted that Korean entries also figure in Illich-Svytich's dictionary under Altaic. The overlap between Nostratic and Eurasiatic, consisting of Indo-European, Uralic and Altaic has led some writers to employ the term *Eurasiatic/Nostratic*. My own view is that although all the languages included in Nostratic are related they do not form a family. By a family at any level is meant a set of languages whose members share an exclusive common heritage and is complete in that it contains all of the languages which share this heritage. Thus the Romance languages and the Indo-European languages are families in this sense, although at different levels. On the other hand a group consisting of Swedish, Albanian and Hindi is a set of related languages because they are all Indo-European but they do not form a family. This is, I believe, the case with the classical Nostratic grouping. For one thing, Indo-European is more closely related to Uralic, and, I would add, a whole series of languages of Northern Asia than to Afroasiatic. Nostraticists themselves have recently moved in this direction. At least one prominent member of the school, Allan Bomhard, has come to share a view almost identical with my own. For details the reader is referred to Greenberg (to appear).

In the present paper there will be presented but a small portion of the grammatical evidence linking the Eurasiatic languages, centering on certain aspects of the first and second person pronouns.

We may begin with the first person singular pronoun which in Indo-European shows suppletion between the nominative and oblique forms. The nominative is usually reconstructed as *eg(h)om*, while the oblique cases begin with *m-*.[1] Of special importance here is the genitive usually reconstructed as **mene* whose stem *men* has in some languages been extended to other oblique cases, e.g., Old Church Slavonic instrumental *mĭnojǫ*, dative *mĭně*.

This suppletion between nominative and oblique stems has survived in almost all Indo-European languages, e.g., English *I/me*, French *je/moi*, Sanskrit *aham/ma:m*, etc. Brugmann said that this suppletive paradigm took us into the abysses of Proto-Indo-European in which we could only find our way by groping. Brugmann made two suggestions regarding *eg(h)om*. One was that the initial *e-* was a deictic element like that of Classical Greek *keinos* alongside of *e-keinos* 'he'. The final *-om* he identified with the neuter singular nominative of the thematic stems, e.g., Latin *-um*, Greek *-on*, to which he attributed an abstract meaning. He translates the whole form as 'meine Hierheit', 'my hereness'.

In 1960 Savchenko proposed that the final *m* was to be identified with the first person singular *m* of the oblique cases of the pronoun and of the first person singular inflection of the verb. This view was supported in Myrkin (1964) and is accepted in the standard comparative work of Szemerenyi (1970).

The first person singular pronoun of Chukchi is *egəm*.[2] This form is, of course, startlingly similar to that of Proto-Indo-European and this has, to my knowledge, never been noted before. Is it just an amazing accident? That it is not can be shown by other data, both from Chukotian, of which Chukchi is a member and from Eurasiatic data which will be cited in the course of this paper.

The Chukchi data immediately shed light on the two conjectures of Brugmann. In Chukchi, alongside of *egəm* there is the form *gəm*. The grammars of Chukchi treat the longer form as basically a marker of the category of first person of the noun to which it is suffixed. Though it is uncommon, languages in which the noun has a category of person is found in other languages, e.g., Tupi. When suffixed to the stem of the noun for 'man' it may be paraphrased as 'I-a man' or 'I-being a man'. However in Chukchi it also has important predicative uses, e.g., *ənpənač-egəm* 'I am a man' and *ge-cejv-igəm* 'I am gone'. The shorter form *gəm* is the absolutive case in an ergative case system and is also used as the object pronoun in some bipersonal forms of the transitive verb, as in *ne-l'u-gəm* 'they see me'.[3] It is also the base of oblique forms of the pronoun, e.g., the locative *gəm-ək* 'in me'.

All this, of course, supports the view that the initial element of Proto-Indo-European *e-g(h)om* is a deictic. Demonstratives can be markers of predication as, e.g., in Coptic in which the enclitic demonstratives *pe* (masc. sing.), *te* (fem. sing.) and *ne* (plural) are used as predicators. An example is *u-agathos pe p-cois* 'The Lord is good' (a-good-(one) this the-Lord).

However the Chukchi second person singular *egə-t*, with the common Indo-European *t* second person obviously supports Savchenko's conjecture that the final *m* of *eg(h)om* is an exponent of the first person.

Further occurrences supporting the Eurasiatic ancestry of Indo-European *eg(h)om* are found in other branches of Eurasiatic, namely Uralic and Eskimo. In Hungarian there are independent pronominal accusatives *en-ge-m* 'me' and *té-ge-d* 'thee'. Here the initials *en-* and *te-* derive from the independent pronouns *én* 'I' and *te* 'thou' used as emphasizers. Forms related to these are found in Vogul (Ob-Ugric) and the Samoyed languages Kamassian, Enets and Nenets, thus showing that these forms go back to Proto Uralic.

The transitive verb in Eskimo has sets of bipersonal subject-object pronominal suffixes. One of these is **am-kit*, 'I...thee'. Here *m* is the well nigh universal first person singular pronoun of Eurasiatic and *-kit* corresponds to the second person *gət*. In Bering Island Aleut, whose inhabitants were transported from Atka and who therefore spoke the central of the three major dialects of Aleut, a first person plural pronoun *γammas* is reported by Menovshchikov (1968: 389), employed as a first person plural possessive pronoun 'ours' or less frequently as a nominative 'we'.

Except for the survivals just noted in Uralic and Eskimo-Aleut, the usual development outside of Indo-European and Chukotian has been to generalize the oblique stem *m-* to the nominative often with the genitival *-n-* seen in Proto-Indo-European **mene*. The generalization of a genitive to other oblique cases is a common typological development. In English, *of* is used in locative and instrumental expressions such as *on top of*, *in front of* and *by means of*. In Proto-European the oblique *-n-* of the *r/n* stems is an example of this tendency. The further extension of *-n-* to the nominative is seen in Finnish *mina*, but Vod, a Finnic language, *miä* 'I', *minu* 'my' and Azerbaijani Turkish *män*, but Mongolian *mi* 'I', genitive *minu*.

We now turn to a further consideration of these forms not only in Chukchi but in other languages of the Chukotian (also called Chukchi-Kamchadal) grouping. We find a clear division between a northern Chukchi-Koryak branch and a southern Kamchadal one. The only surviving dialect of Kamchadal is Western Kamchadal and it is the only one of which we have detailed descriptions. As we shall see however there were other dialects, chiefly the Southern and Northern of which we have early recordings and which will be considered below. In Kamchadal the deictic prefix *e* is not found and the second person forms derive not from *t* as in Chukchi-Koryak but from *s*. Indo-European of course has both, e.g., Latin *tu* 'thou' but *ama-s* 'thou lovest'. Thus present-day Kamchadal (i.e. Western Kamchadal) has *kəmma* 'I' and *kəzza* 'thou' in the absolutive case. In agreement with Chukchi-Koryak the oblique cases are built on the absolutive, e.g., Kamchadal *kəmma-nk*, (locative) 'in me'.

In the nineteenth century, extensive vocabularies of Northern, Western and Southern Kamchadal were collected by Dybowskij and recorded in the Cyrillic alphabet. This material was published by a Polish scholar Radliński in 1891–1894 who transcribed them into the Latin alphabet but also gave the Cyrillic original and translated the Kamchadal list into Polish and Latin. In the Southern dialect we find *kim* with the translation *ja/ego* and *ma* glossed by *mnię/me*. Thus the IE first person suppletion existed in Southern Kamchadal. Moreover this same suppletion is found for the second person singular pronoun in the second person singular also, in the form *kis/si*. Our provisional interpretation of the historical development here, which is strengthened by further evidence to be presented below, is that the IE pattern is the original Eurasiatic one and that in Chukotian the *(e)gom* form spread to the oblique cases of the first person singular and then to the second person in the shape of Chukchi *egə-t* and Southern Kamchadal *kys* as well as to the oblique forms of the second person, e.g., Western Kamchadal *kəzza-nk* 'in thee'.

This suggests that forms like Indo-European **tu* should formerly have existed in Chukotian. Indeed this is shown by three independent sources. One of these is Dall (1895) in which vocabularies recorded by members of the Ringgold and Rodger's *North Pacific Exploring Expedition 1852–1863* are published for the first time. These include a vocabulary of Chukchi in which 'I' is rendered by *ichem*, which we are told is to be pronounced in the German fashion and 'thou' is *tua*. That similar forms existed in Kamchadal is shown in the Radliński-Dybowski vocabulary in which *ty/tu* is rendered by *tue* in the Northern dialect.

An even earlier attestation is to be found in Klaproth's *Asia Polyglotta* in which, under Kamchadal dialects, a word list from Ukä (modern Ukinsk) in the extreme northeastern part of Kamchadal territory is given in which 'thou' is given as *tu*. There is thus ample attestation of *tu* as the earlier form of the second person singular pronoun in Chukotian.

The former existence of *tu* also helps to explain the first person plural Chukchi pronouns *muri* 'we' and *turi* 'you', whose *u* vowel is not paralleled for the plural pronouns anywhere else in Eurasiatic. The plural *-ri*, discussed in more detail below, was added to the singular *tu* producing *tu-ri* and then extended analogically to the first person.

But what was the source of the *-ri* plural found in both Chukchi and Koryak? This plural is confined to pronouns. In Chukchi *-ri* is also found in the third plural *ət-ri* so that it appears in all three persons.

In Indo-European there is a third person verbal plural in *re/ri*, e. g., Latin *dixēre* 'they have said', with similar forms in Indo-Aryan, Anatolian and Tokharian. As early as in 1888, Zimmer connected these forms with the *r* passive, known at that time in Italic and Celtic but later found in Tokharian, Hittite, Phrygian and Venetic. To show the connection between the third person plural and the passive, Zimmer pointed to the impersonal *-r* of Italic and Celtic, e.g., Umbrian *i-er,* 'they go, one goes', and Breton *am gwel-er* 'they see me, one sees me, I am seen'. This is a typologically-well known method of forming a passive (cf. Greenberg 1959).

In Altaic two kinds of medial *r* are distinguished. One of these (r^1) appears everywhere in Altaic as *r.* The other (r^2) appears in non-Chuvash Turkic as *z*, everywhere else in Altaic as *r*, e.g., Turkish *biz* 'we' but Chuvash *e-pir* in which Chuvash *e-* is probably the same deictic *e* we have already encountered in Chukotian and Indo-European. It is generally accepted that r^2 goes back to *ri* and is a palatalized consonant. Reflexes similar to Turkic *z* are found in Northern Kamchadal *buzhe* 'we' and Southern Kamchadal *mush.* Other examples of this *-ri* plural are to be found in Tungusic, e.g., Manchu *mufa-ri* 'grandfathers'. In Korean the first person plural pronoun is *u-li.* Ramstedt proposed that this derived from **wu-li,* corresponding to non-Chuvash Turkic **biri* > **biz.* Further evidence for this *r* pronominal plural is provided by Amur Gilyak *me-r,* cf. *me-gi* 'we two'.

A development parallel to Indo-European, by which the third person pronominal plural *r* developed into a passive or intransitive occurred in Mongolian. Examples are *asqa-* 'to spill' (trans.), *asqa-ra* 'to spill' (intrans.) and *ebede* 'to break', *ebede-re* 'to be broken'. Also in the oldest non-Chuvash Turkic that we have, the language of the Orkhon inscriptions, there is an *r* middle. Finally in the language of the Ryukyu Islands, genetically the closest to Japanese, there is a verbal suffix *-ri* described in Chamberlain (1895) as 'passive, potential'. This same formation is productive in Standard Japanese, where in a number of variants it is the chief indicator of intransitives and passives. In Old Japanese it takes the form *-ar-*, also *-or-* and *-ur-*. Compare modern Japanese *oku-* 'to put' and *ok-are-ru* 'to be put'.

There is no need for speculative theories based on internal reconstruction in Indo-European, many of which are immediately refutable by comparative evidence. The same is equally and as importantly true for other branches of Eurasiatic. An example is Korean with its vast elaboration of politeness levels and the absence of the typologically usual kind of pronominal system and lack of inflection for person in the verb. In Korean there is a verbal suffix *-ma* which always immediately follows the verb base, including here derivational elements and is not followed by any other inflection. It is called the INTENTIONALIS and expresses an emphatic wish or promise on the part of the speaker, being used only in the first person. Bruno Lewin (1970), following indigenous grammatical theory explains it as the verbal noun in *-m* followed by the vocative *-a,* on the face of it an implausible theory. A derivation from the well-nigh universal first person *m* is far more likely. The Korean verb likewise has a polite honorific *-si* which is always first in the inflectional complex in which it figures. It is used both for the second and third person. It may be compared to the widespread second person *s* which we have already encountered. The *-i* is a common plural marker in Eurasiatic, e.g., Indo-European and Uralic. This very combination *-si* as an indicator of the second person plural has already been encountered in Southern Kamchadal and is found in this form in Eskimo as an indicator of the second person plural of the intransitive verb and as a possessive suffixed to the noun.

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[1] The parentheses of the *(h)* of *eg(h)om* are because of the Indo- Iranian forms which reflect an Indo-European voiced aspirate. Forms like Latin *ego* without *-m* are explained as analogic to the first person singular ending of the present indicative of the thematic verb, e.g., *ego legō* with the short *o* of *ego* as due to the iambic shortening law.

[2] Phonetically Chukchi has a voiced velar fricative but in the absence of a contrast with a stop in this position the phonemic transcription with *g* is usual and is found in the Russian sources.

[3] These forms are usually translated as having first or second person objects, but they are probably to be considered as agents in an ergative system. Indeed 'they see me', etc., when accompanied by independent pronouns has the first person pronoun in the instrumental and the third person plural in the absolutive.

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FUNCTIONAL PASSIVE RETHOUGHT

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THE NOTION of passive voice comes out of a Latinate tradition, one that involves case and viewing a language from the perspective of transitivity. This perspective assumes that the prototypical clause will involve two entities: an agent and an affected participant. Such a view derives from work with languages, such as English, that are agent-centered and action-oriented. Thus, clauses that vary from this assumed normal set-up of conflation of subject/actor/agent are seen as marked. But languages vary enormously and what is prototypical for one language may not be for another. As a result, notions such as passive need to be rethought. This paper will explore the notion of passive by looking at Dari, an oral dialect of Persian spoken in Afghanistan.

What *is* passive? Traditionally, passive voice has been seen in grammatical terms as the analog to active voice, where the subject of the sentence is not the actor (or speaker or cognizant). Transformationally, a passive sentence is one where the object is moved to subject position (and to the beginning in English). Functionally, the notion of passive is broadened to include varying degrees of suppression of agentivity: by moving the agent out of thematic position, by omitting the agent altogether, or even by obscuring agentivity through the use of such generic designators as unspecified 'they' or 'some people'.

Talmy Givon (1979:186) says that 'passiv*ization* is the process by which a *non*agent is *promoted* into the role of main topic of a sentence' [italics mine]. This notion of passive assumes that in a prototypical clause, agent is 'the main topic'. This is a definition that sets up passive as a transformation of the normal state of affairs where the clause is action-oriented and the actor is the focus both grammatically (i.e., subject) and thematically (i.e., Theme or topic). But there are numerous languages for which this is not the case.

Dari is one of these languages. Briefly, Dari is not an action-oriented language; while English is agent-centered, Dari is affect-centered. The prototypical clause in Dari centers around an affected participant. Dari is more in line with what Li and Thompson (1981) call a topic language. First, it is a verb-final language with semantic loading in the verb. Second, there is no agentive passive; that is, agent must always be a direct argument, or in Hallidayan terms, agent must be a direct participant in the process. Third, subjects are only markedly overt. Thus, in Dari, the prototypical clause has as its 'main topic' (or Theme), not an agent, but an affected participant, a 'non agent'. Therefore, it makes no sense to talk of suppression of agentivity; agents are typically unspecified and affected participants are typically already Theme and more 'topical' than the agent.

In grammatical terms, what does Dari look like? The notion of passive involves the whole concept of case and the subject/object distinction, but this is a distinction that is less clear for Dari than it is for English where the semantic subject (Theme) and the grammatical subject usually conflate in the same participant function. Thus, for English the notion of subject is a relatively stable one; but the category of subject is difficult to define in universal terms. This becomes very real when analyzing Dari. Case is used to a different effect in Dari than in Latinate, traditionally nominative, languages. Though there is always an underlying subject, there may or may not be an overt grammatical subject. An illustration of this is seen in (1), an example taken from an oral Dari narrative on the history of Islam (the data base for this paper). The English equivalent would be 'he took this rock', with 'he' realized only as the null suffix on the verb *geraft.*

(1) *ami sang / geraft-ø*
this rock took 3-SING

If 'subject' is a fuzzy concept in Dari, then 'object' is even more difficult to define. Dari's ergative orientation makes the transitive/intransitive distinction less potent than for English. While there is an affix marker often labeled the direct object (DO) marker, its use is complicated and not fully understood, involving more than the marking of object. Clauses can have only one 'object', either a direct object (as in 2b) or an indirect object (as in 2a) but never both (2c). One of these participants must be stated as an indirect argument realized as a prepositional phrase (2e) or a relative *ke* clause (2d).

(2) a. *arab-ha -ra / goft*
Arab-PL-DO said
b. *i(-ra) / goft*
this said
c. **i(-ra) arab-ha(-ra) / goft*
this Arab-PL said
d. *arab-ha-(-ra) / goft / ke...*
Arab-PL said that...
e. *i(-ra) / bare arab-ha / goft*
this for Arab-PL said

In addition, in Dari, the distinction between subject and object is not always a clearcut one. This becomes apparent when we look at clauses like (3). Here it is the decrees, *farman-ha*, that are 'arriving', but they are doing so under the auspices of an outside agent; they do not just float down on their own. The verb *merasan* is difficult to translate into English, but the essence is that of arriving through the agency of some outside means of delivery, in this case the prophet, *piqambar*. But the narrator, of course, does not put 'the prophet' in thematic position because it is God who is the true agent, not the prophet; instead the narrator makes 'the decrees' the topic of the clause. In strict grammatical terms, it is difficult to know if 'the decrees', *farman-ha*, is subject or object; there must be an outside deliverer but that deliverer is realized only as an indirect argument in the clause.

(3) *i farman-ha /tawasute piqambar/ bare mardum/ me-ras-an*
this decree-PL via prophet for people IMP-deliver-3p

Because of this fuzziness of grammatical category, and Dari's ergative orientation, it is perhaps more profitable to view Dari from a functional perspective and ask how participants function logically in the process. In Dari, there is always a central participant, though it may be realized only as part of a complex predicate. A process may consist of only the process itself (i.e., have no direct participants) or have only indirect participants. There is always an affected participant (AP) and there may or may not be an outside engendering agent (A). Four possibilities exist for the distribution of participants: 1) two direct participants, both an AP and an A; 2) one direct participant (AP) plus an underlying agent; 3) only an AP with no agency involved; or 4) no direct participants.

If both an AP and an A are realized as direct participants, either can appear in first position in the clause. The constraints on this seem to be contextual, and in the narrative from which these data were taken, the AP appears first with slightly more frequency. This AP may or may not be marked with *-ra*, the so-called direct object marker, but usually is marked when there are two direct participants. In (4), the AP appears first and in (5), the A appears first.

(4) *i-ra / xoda / andoxt-s*
this-DO god dropped-PF

(5) *ma / šumaa-ra / hast kard-im*
I you-DO create did-1-PER

If there is only one participant in a clause, it is always an AP. In addition, there may or may not be an underlying agent. (1) is an example of a clause with an underlying agent. Here this agent is only realized as the null suffix on the verb. We know from the previous clause that this null suffix does not refer to 'this rock' but to God. (Our knowledge of the world also tells us that rocks do not 'take'.) But a clause may actually be minus agency. In examples (6) and (7), there is no agent, though we know that *someone* must be doing the conquering in (6). In (3), as we have already seen, agency is only implied; the prophet is not a true agent but merely a path through which the decrees are delivered. In Dari, agency is never realized as an indirect participant.

(6) *futuhat / ziat šud*
conquering a lot became (increased)

(7) *aqam / bera šud-a bud-an*
tribes lost became-PF was-3p

Clauses without any direct participants are quite common in Dari. Example (8) comes from the data; in English one would probably say, 'He has returned'. Example (9) is a phrase heard constantly in Afghanistan (as well as the Arabic-speaking world); it means 'it is finished' or 'that's all'. This latter example surely meets Givon's definition of a functional passive, but there is, in fact, no agent to be suppressed and the verb itself is in no way marked as passive.

(8) *pas amad*
again came (returned)

(9) *xalas-ast*
finished-be

In conclusion, Dari does *not* have an active/passive contrast. Agentivity is seldom the 'main topic', and overt agents only markedly occur. Functionally, Dari is a 'passive', or ergatively-oriented, language, one where the 'main topic' is typically the affected participant. Thus it makes no sense to speak of the suppression of an agent or of passive as the promotion of a nonagent to topical status. Instead, for Dari the normal state of affairs is one where there is a central participant that is the one affected by the process; agency may be an additional participant that gets more or less attention depending on its importance to the discourse.

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MARKEDNESS EFFECTS IN WELSH SHORT PLURAL FORMS

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1. INTRODUCTION TO PLURALS AND MARKEDNESS.* In languages throughout the world plural forms of words are typically formed in one of two ways—they are either related to the singular in an iconic manner or they exist as noniconic forms which differ from the singular in a nonpredictable manner, as in English *foot-feet*. Of these two methods, iconic relation of the plural to the singular is the more common. Iconism in this case refers to instances where the relation of the plural to the singular is a transparent one in which overt marks such as suffixes, prefixes or reduplicated syllables are used to indicate plurality. Examples are the English plural *-s*, the Norwegian plural *-er*, and the Hungarian plural *-k*. Take the Hungarian word *toll* 'pen'—the plural is derived by adding *-k* to the stem, yielding *tollak* 'pens'. The Norwegian plural functions similarly with *bygning* 'building' and *bygninger* 'buildings'. In all these cases the relation of the singular to the plural form is transparently iconic and the plural is understood by reference to the singular form.

Noniconic relationships do exist as well in singular-plural formation. Such singular-plural pairs must be learned and the relationship among the parts of the pair is not immediately obvious. Most languages which have plural forms do have some terms of this sort. Examples are English *man-men, mouse-mice, person-people*, Old Norse *maðr-menn* 'man-men', and Norwegian *bruder-bredren* 'brother-brothers' (cf. archaic/religious English *brother-brethren*). Such relationships are said to be 'opaque' because the relation of the forms is not immediately obvious and one form cannot be derived from the other.

Attempts are often made to explain morphological features of language based on markedness theory. Markedness theory holds that some forms are more 'marked' than others. A marked form is a form which conveys more semantic information than another form does. This is typically indicated on a morpho-syntactic level by the inclusion of some sort of overt mark such as the plural *-s* in the case of plurals or *-ed* in the case of English past tense. Marked forms which are derived from unmarked forms are said to be 'constructionally iconic', and as a general principle it can be stated that 'what is semantically "more" is reflected in "more" form' (McMahon 1994:98).

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Relationships in which an unmarked term is derived from a marked term are very uncommon because of a profound tendency in language for a marked term to be influenced by the unmarked. This is known in historical linguistics as conformative change. In a recent text on historical linguistics that deals with iconism and markedness as instruments in language change, it is stated that countericonic relationships (relationships in which a category that is typically unmarked is iconically derived form a marked category) are exceedingly rare (ibid. 100).

In contrast to this general statement, one class of nouns in Welsh displays a formation in which the singular is derived from the plural in an iconic manner and in which the plural form represents a historically singular stem. In this paper these will be termed 'short plural' nouns. These nouns seem to have referents which tend to occur in groups in nature and are hence lexically plural. An analysis in which these terms are viewed as being lexically unmarked in the plural shows a strong motivation for this odd plural formation. Additionally, the nature of the singular suffix provides strong support for this view.

1.1 WELSH PLURAL FORMATION. In Welsh the vast majority of plurals are formed in manners typical of Indo-European languages. There are three major methods of plural formation. The first is suffix addition; the second is stem vowel mutation; and the third is a combination of these two. In general singular forms represent bare stems as they do in English.

Suffix addition is a very common form of plural-formation in Welsh. It is a very iconic sort of formation in which the relationship between the parts is transparent. Welsh has a great number of plural endings. These include *-au, -iau, -ion, -on, -en, -i, -ydd, -edd, -oedd, -ed, -od, -iaid, -aint, -er,* and *-yr.* In general these endings are added to the singular to form the plural, as in *pen-pennau* 'head-heads' and *dyn-dynion* 'man-men' (Morris-Jones 1975:45).

Stem vowel mutation (known as ultimate i-affection) is a historical remnant from a time when Welsh had more inflections than it currently does (ibid. 1975:39). Affection refers to the fronting and/or raising of vowels in the ultima of the stem in anticipation of an *i* (either vocalic or consonantal) or *y* in a suffix which was at one time added to the stem. This process is very similar to umlaut pluralization in Germanic languages. The endings which caused the mutation of stem vowels have since been lost, leaving only the stem vowel change to mark where they once were (ibid. 1975:33). An example of this type of plural formation is *brân-brain* 'crow-crows'.

The most common form of plural formation is a combination of affixing and affection. In words which show this form of pluralization the affecting suffix is present along with the stem change it causes. *Gair-geiriau* 'word-words', *cŵn-cynion* 'dog-dogs', and *brawd-brodyr* 'brother-brothers' are examples of this sort of plural formation. In addition to forms which show affection in the plural there are are a limited number of words which show the effects of a lost ending in the singular but not in the plural, e.g., *gwraig-gwragedd* 'wife-wives' (ibid. 1975:42).

The three forms of plural formation mentioned above are highly typical of Indo-European and present no problems of analysis. They are all sorts of plural formation which one would expect to find in language. There is, however, a fourth class of words in Welsh which are a direct counter-example to typical constructionally iconic methods of plural formation. It is the purpose of this paper to explain the nature of these words.

The fourth plural formation method in Welsh is traditionally analyzed as one in which plurals are formed 'by losing a singular ending' (Williams 1980:9). Examples are *coedyn-coed* 'tree-trees' and *mochyn-moch* 'pig-pigs'. The endings found on the singulars of these nouns are *-yn*, *-en*, and, rarely, *-cyn*. The endings *-yn* and *-cyn* are masculine and *-en* is feminine.

The method of plural formation in Welsh is typically referred to as 'subtractive plural' formation, although it will be seen that this is a misnomer, at least in Welsh. In subtractive plural nouns the plural form is shorter than the singular. An example of this sort of plural formation is seen in Hessian German with the words *hond* and *hon*, 'dog' and 'dogs', (as compared to standard German *Hund-Hunden*). In this case the terminal *d* of the stem is dropped to form the plural (McMahon 1994:100). Although subtractive plural formation is a synchronically adequate, although perhaps not historically accurate, description of this phenomenon in Hessian, it is not an appropriate description of the process of plural formation in these Welsh short plural nouns.

2. WHY NOT SUBTRACTIVE PLURALS? There are two main problems with any theory which considers the short plurals in Welsh to be derived through subtractive plural formation: first, more singular than plural forms show i-affection (stem change), the opposite of what would be expected were the plural formed from the singular (in which case no i-affection would be expected since 'reverse' i-affection has never been part of Welsh), and, second, a large number of the stems include plural endings as part of the stem, even though these endings were not part of the proto-Celtic stems. A third element is also important—the plural forms of these nouns are generally used, while the singular forms are reserved for use after cardinal numerals (Welsh uses the singular after cardinals in all cases).

2.1 Stem vowel changes. Of the terms examined, only six (1.6%) of the plural forms show affection in the penult, which is characteristic of inflected forms. Fifteen (4.1%) of the singular forms examined do show affection. Given a traditional view of short plural formation the affection in the plurals is to be expected as a mark of the plural, but the affection in the singulars is unexplainable.

The traditional explanation holds that the affection in the singular is the result of the singular ending, usually *-yn*. When this ending is dropped, the affection disappears. The problem with this is that it posits an underlying stem which is identical to the plural in all fifteen cases. The question then is, if the underlying form is identical to the plural, why consider the singular to be the unmarked base form?

If the position is held that the plurals do in fact represent the stems of these nouns, one must explain those words which show affection in the plural but not in the singular. Statistically this is less important as there are fewer terms which show plural affection, but they must be explained. The answer may perhaps lie in other Welsh terms which have singular forms terminated by *-yn* and *-en* and plurals which show normal plural endings such as *miaren-mieri* 'bramble-brambles', *cerdyn-cardiau* 'card-cards', and *cerpyn-carpiau* 'rag-rags' (Williams 1980:14). This sort of inflection is similar to the nature of inflection in Latin or Greek (as in Lat. *fēmina-fēminae* 'woman-women') in which the stem is never bare but has either a singular or a plural ending. Those short plural nouns in Welsh which have affection in the plural form seem to be remnants of a time when a plural ending that is now not present caused affection. The fact that these words historically had plural endings does not conflict with the basic thesis of this paper that the plural forms of these nouns today represent bare stems in general. In fact, a view in which the plurals are unmarked is supported by the historical presence of plural endings, for it is only in the plural that the endings were lost, making an *overtly unmarked* form. This is a strong indication that the plural is unmarked with regard to the singular, which has retained an overt grammatical mark.

It seems that a theory of short plural formation which holds to subtractive plural formation is untenable. Historical evidence seems to indicate that there has been a shift in these nouns from an inflected plural form to a noninflected one while the singular has remained inflected throughout. This loss of grammatical marks is what would typically be expected of an unmarked category while the retention of suffixes in the singular seems to indicate that the singular is marked with respect to the plural.

2.2 Plural inclusion. The second major reason to view the plural as being unmarked is that many of the stems include plural endings which have been interpreted as integral to the stem. Approximately 20% of the terms under

Step 1: proto-Celtic **pisc* 'fish'
Step 2: Welsh **pysg* 'fish' (sing.) and *pysgod* 'fish' (plur.)
Step 3: *pysgod* is interpreted as the stem and *-en*, a feminine singular suffix, is added to make the singular form *pysgoden*.
Step 4: the plural *pysgod* drops its *-od* plural ending in many speakers' idiolects leaving the old singular *pysg* along with *pysgod* in the plural. The singular is now a doubly marked form consisting of a historical stem with both a plural and a singular suffix.

Figure 1. The historical development of a Welsh short plural noun, *pysgoden-pysg* 'fish-fishes'

consideration have plural endings included within their stems. One example will serve to show the nature of these terms. The word is *pysgoden* (pl. *pysgod*) (see figure 1).

Through reconstructive methods it has been discovered that the proto-Celtic word for fish was **pisc-*. Welsh derived the stem **pysg* from this root. At some point the plural ending *-od* was added to *pysg* to give a pair **pysg-pysgod* 'fish-fishes'. This is a typical plural formation in Welsh. What happened next was the reinterpretation of *-od* as part of the stem, which probably yielded one form *pysgod* in which no distinction was made between plural and singular, as in English *fish-fish*. Finally, the singular *pysgoden* was formed by the addition of the singular feminine suffix to *pysgod*. Subsequently the *-od* was dropped in the plural by many speakers, so that *pysg* and *pysgod* are now alternate plural forms in free variation for most speakers. *Pysgoden* is the only singular form. Because of this process the modern word for a single fish is of a form that would roughly correspond to an English 'one fishes'. All of this indicates that the plural is unmarked with relation to the singular in the case of *pysgod*.

As mentioned above, Welsh requires there to be a grammatically singular form of every noun because nouns always take their singular form following numerals. As a result one speaks of *dynion* 'men', but *pump dyn* 'five men' are literally 'five man'. (This is a general rule and not indicative of any sort of markedness reversal.) In some cases, however, such as *blodfresych* 'cauliflower', the plural is always used to refer to the vegetable except when the singular is used after a numeral, as in *chwech blodfesychyn* 'six (heads of) cauliflower'. In this particular construction the singular is the marked form, its usage being a grammatical requirement of the construction.

All of the above evidences point to a view in which the plural is the grammatically unmarked category in nouns displaying short plural formation in Welsh, although it is not unmarked for most nouns. The strongest evidence is that the plural represents the bare stem of these nouns, a form usually taken the grammatically unmarked form. Following this is a discussion of the par- how short plural formation in Welsh. An examination of the nature of these words will serve to indicate why these terms are grammatically unmarked in the plural. A discussion of the concept of lexical plurality and lexical markedness is included with the discussion of the short plural words.

3. SHORT PLURAL WORDS IN WELSH. A first glance over the list of words which show this plural formation yields no apparent rhyme or reason for the strange nature of these words. What do birds, the small bones of fish, shrubs, gnats, badgers, gravel, lightning, capillaries, stars, sand and onions have in common? What distinguishes these words from the bulk of words in the language?

A closer examination reveals that a large number of these words are types of plants, in fact 95 out of 166 of these terms are either plant names or are products of plants (sticks, berries, bark, etc.). So about 57% of these terms are plant related. It is also notable that 29 (17.5%) of these terms are names of animals (of these 14 are of insects). Together about 75% of these terms are plants or animals.

At this point one might be tempted to say that this class of nouns is a category defined by the term 'life', and dismiss the other terms as flukes—there are only 32 terms in *Y Geiriadur Mawr*, a standard Welsh-English dictionary, which are of the form under consideration that are not also names of plants (or their products) or animals. A list of the glosses of these words does not appear to help either: hair, bit or fragment, brick, crumb, ridge-tile, skittle (a pin in a bowling-like game), oatcake, tool, scab, pancake, lattice, drop, furniture, pancake (a second word), pebble, vein, lightning, a piece of dust, capillary, lightning (again), entrails, instrument, child, shell or casing (of anything), pimple, feather, snowflake, rag, star and tile.

As there is no readily apparent means for grouping the above terms it might seem as if there is little point in continuing beyond the hypothesis that all these odd words either belong to the category of 'life' or to the category of 'flukes', which is to say that there is no proposed order. In addition there is one more seemingly inexplicable problem—the majority of animal and plant names in Welsh follow more normal forms of plural formation and the forms showing plural shortening (or singular lengthening) are not distinguishable in terms of general qualities from their more standard counterparts, so a category of 'life' would not be an adequate explanation of short plural formation. In fact some of the animals have names that are of the odd category as well as more normal names, e.g., a gadfly is called *pryf llwyd* (plural *pryfed llwyd*) in addition to *cleheryn* (plur. *clŷr*).

At this point there again seems to be an impasse. If one animal can have two names, one of which is an example of the anomalous plural formation and the other of which is normal then it is tempting to say that they are vagaries the of language or remnants of some principle which was once active in Welsh but which is no longer active. However, as shall be demonstrated, short plural forms are quite logically derived according to a general principle.

3.1 LEXICAL MARKEDNESS. The concept of lexical markedness will help to explain the problem of the Welsh words under consideration. Basically, the concept of lexical markedness holds that some terms can be lexically or semantically marked for certain linguistic features such as singularity or plurality, regardless of what they appear to be in form. The following examples from Frisian and other languages will help elucidate this principle:

Tiersma (1982) reports that in Frisian, plurals are often formed by the addition of the plural suffix *-en* and by a stem diphthong change from the singular. Conservative plurals like the plural of *poel* 'pool,' *pwollen*, show this type of plural formation. There is currently a trend to bring the diphthong of the plural in most words into conformity with the diphthong present in the singular—for example, the innovative forms of 'pool' are singular *poel* and plural *poellen* where the stem diphthong *wo* in the plural has become *oe* by analogy with the singular.

There are examples in Frisian however, in which the stem vowel of the singular changes to the stem vowel of the plural. Historically conservative singular-plural pairs of some of these words include *earm/jermen* 'arm/arms', *goes/gwozzen* 'goose/geese', and *hoarn/hwarnen* 'horn(animal)/horns'. The innovative forms of these words are *jerm/jermen*, *gwos/gwozzen*, and *hwarne/hwarnen*. In all these cases the singular has been influenced by the plural and has changed its stem vowel to match that of the plural—the grammatically marked plural has influenced the grammatically unmarked singular, an apparent markedness reversal in which the normally unmarked term has changed to match the normally marked term—a total reversal of normal trends.

One analysis of Tiersma's data explains, '...certain lexical items in Frisian whose meaning is 'arm', 'goose', 'tooth', 'tear', and the like are inherently plural, and these most naturally co-occur with the markers for plurality. It is precisely with such nouns, and only such nouns, that markedness reversal took place in Frisian' (Robertson 1992:26–27).

Tiersma refers to these words as ones which 'exemplify LOCAL MARKEDNESS' and states as a principle, 'when the referent of a noun naturally occurs in pairs or groups, and/or when it is generally referred to collectively, such a noun is locally unmarked in the plural'. He then goes on to give frequency data from English, German, Dutch and Spanish to show that these words do indeed tend to be referred to in the plural (Tiersma 1982).

An example similar in principle is found in some English singular-plural pairs. These are pairs such as *mouse/mice*, *goose/geese*, *louse/lice*, and *tooth/teeth*. Note that 'tooth' and 'goose' are two of the same words which underwent markedness reversals in Frisian. These forms show irregular plurals that are historical remainders of once productive plural formations. The reason these plurals were not standardized to use the plural *-s* is their lexical plurality; there is something inherently plural about these words—the idea of one louse, one mouse, etc., is somehow marked with relation to the idea of many mice or lice, so the irregular forms are maintained because they are more basic than the singulars and regularizing them would put a mark on them that is not needed from a lexical standpoint (Robertson, personal communication). In some cases in which irregular plurals exist in English the use of regular plurals is highly marked, e.g., *person/people* with *persons* being used very specifically and never as the general plural, and *fish/fish* with *fishes* used to refer to multiple types of fish or to the collective of all the fish in the world.

Consider the following lyrics of 'Home on the Range', 'Oh give me a home where the buffalo roam and the deer and the antelope play...'—there are three names of animals in one line of this song whose singular meanings are so highly marked that the singular forms are not distinct from the plural forms and the plural forms look like singulars. (This is very interesting when it is realized that the plurals of the Welsh terms under consideration appear exactly as do singulars of most words; it is not so inconceivable that in English the plurals of these words would do the same and appear as bare stems.)

Having established the role of markedness in the retention of (ir)regular plurals in Frisian and English the subject can return to Welsh.

3.2 LEXICAL PLURALITY AND SHORT PLURAL FORMS. An examination of the list of words reveals that all of the words (with one exception, which will be explained) can be looked at in terms of a lexically unmarked plural. The addition of an ending (a grammatical mark) to form the marked singular should be no surprise.

A number of these words bear individual comment to lend credence to the hypothesis that the plurals of these words are less marked than are the singular forms. Not all words will be discussed as the significance of them bears no comment or is redundant with comments made concerning other words in the list.

The first word that needs to be commented on is the one exception mentioned above. This is the word for badger, *daearfochyn*. In general, few people would associate badgers with groups. But this problem is resolved when it is noted that *daearfochyn* is a compound of the words *daear* 'earth' and *mochyn* 'pig' (pl *moch*), a short plural noun; a badger is then literally an 'earth-pig' or a 'dirt-pig'. (The change of the initial *m* in *mochyn* to an *f* is a regular sound shift that is part of the system of consonant mutation in Welsh and is of no consequence in this example.) It would also appear that the Welsh may at one time have had a different perception of badgers than most people do now;

Welsh Singular	Welsh Plural	English Gloss	Welsh Singular	Welsh Plural	English Gloss
cegiden	*cegid*	hemlock	*afanen*	*afan*	raspberry
cerddinen	*cerddin*	mountain ash	*criafolen*	*criafol*	rowan berry
colwydden	*colwydd*	hazel	*cyrawalen*	*cyrawal*	rowan berry
crabysen	*crabys*	crab apple	*cyrrensen**	*cyrrens*	currant
fferen	*ffer*	fir tree	*gwsberysen**	*gwsberys*	gooseberry
ffyllwydden	*ffyllwydd*	cypress	*llus*	*llus*	whinberry
gellygwydden	*gellygwydd*	pear tree	*mywar*	*mywar*	blackberry
gwaglwyfen	*gwaglwyf*	lime tree	*betysen*	*betys*	beetroot
gwernen	*gwern*	alder	*blodfresychen*	*blodfresych*	cauliflower
gwydd-wydden	*gwydd-wydd*	honeysuckle	*cabaetsen*	*cabaets*	cabbage
helygen	*helyg*	willow	*cneuen*	*cnau*	nut
llarwydden	*llarwydd*	larch	*eirinen*	*eirin*	plum
llinwydden	*llinwydd*	ash tree	*erfinen*	*erfin*	turnip
llorwydden	*llorwydd*	laurel tree	*gellygen*	*gellyg*	pear
merywen	*meryw*	juniper	*meipen*	*maip*	turnip
pinwydden	*pinwydd*	pine tree	*mefusen*	*mefus*	strawberry
poplysen	*poplys*	poplar	*mesen*	*mes*	acorn
ysgawen	*ysgaw*	elder tree	*ogfaenen*	*ogfaen*	rose hip
ywen	*yw*	yew	*peren*	*pêr*	pear
			pibgnau	*pibgnau*	chestnut
			sibolen	*sibol*	young onion
			syfien	*syfi*	strawberry
			wynwynyn	*wynwyn*	onion

Table 1. Short plural terms in Welsh. The set of words on the left consists of the names of trees. The second set is fruits and vegetables. Forms with an asterix by them are English borrowings which include the plural *-s*, a strong indication that the plural forms and not the singulars were borrowed into Welsh.

there is an archaic word in Welsh, *brochwart*, 'keeper of badgers'; *broch*, the first part of the word, is another word for a badger. So perhaps, if badgers were kept by individuals, the perception of them as things found in groups might have been a reality.

Bedwen 'birch' (pl. *bedw*) is representative of many of the words for trees. In English both *birch* and *birches* are used as plurals. The plural, when standing alone in English, is *birches*, but it is common in English to say 'birch are…' or 'a group of birch', because of the lexically plural nature of birch trees. In contrast one would never say 'a group of computer' to refer to a bunch of computers sitting together. The distinction between plural and singular has collapsed to a certain extent in the case of the birch tree (as well as in many other tree names). Birch tend to be found in groups and this conflation of terms to the grammatically unmarked should not be unexpected—the lexically unmarked plural has taken over the grammatical form of the singular in

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WELSH SINGULAR	WELSH PLURAL	ENGLISH GLOSS	WELSH SINGULAR	WELSH PLURAL	ENGLISH GLOSS
bribysen	*bribis*	bit, fragment	*bywionyn*	*bywion*	ant, gnat
bricsen	*brics*	brick	*cleren*	*clêr*	housefly
briwsionyn	*briwsion*	crumb	*cylionen*	*cylion*	gnat, fly
cedysen	*cedys*	wood faggot	*cynrhonyn*	*cynrhon*	maggot, fly
cefnbeithynen	*cefnbeithyn*	ridge-tile	*chwannen*	*chwain*	flea
celficyn	*celfi*	tool	*egnodyn*	*egnod*	flea
ceilysyn	*ceilys*	skittle(1)	*grugionen*	*grogion*	ant
llucheden	*lluched*	lightning	*gwenynen*	*gwenyn*	bee
mellten	*mellt*	lightning	*gwybedyn*	*gwybed*	gnat
crachen	*crach*	scab	*morgrugyn*	*morgrug*	ant
cramwythen	*cramwyth*	pancake	*picwnen*	*picwn*	wasp
ffroesen	*ffroes*	pancake	*malwoded*	*malwod*	snail
diferyn	*difer*	drop	*petrisen*	*petris*	partridge
dodrefnyn	*dodrefn*	furniture	*pioden*	*pïod*	magpie
draenen	*drain*	thorn	*hwyaden*	*hwyad*	duck
drysïen	*drysi*	thorn	*pilcodyn*	*pilcod*	minnow
ysgallen	*ysgall*	thistle thorn			
gröyn	*gro*	gravel			
llychyn	**llych(2)*	speck of dust			
morwen	*marworyn*	ember			
ploryn	*plôr*	pimple			

Table 2. Inanimate short plural nouns and insects, birds and other animals which show plural formation. (1) a skittle is a pin in a sort of bowling game. (2) *llych* does not actually occur by itself, but is found in a number of compounds.

some uses. Many other tree names in Welsh follow a similar pattern. All of these trees are ones that occur in stands or groves (See table 1).

Most trees in fact seem to be of the short plural type. (The ones listed above are just those for which both plural and singular forms are listed in *Y Geiriadur Mawr*—often *Y Geiriadur Mawr* lists the singular and does not give the plural. Almost all other trees listed in the dictionary end in either *-en* or *-yn* and are probably of this type). It is interesting to note that a tree which would not necessarily be seen in groups in Wales, such as the domestic cherry tree, *pren cerios,* is not of the category under consideration here, although *cerios* (sing. *ceriosen*)'cherries' is itself of this type.

A significant number of fruits, berries and vegetables (table 1, column 2) belong to the group of short plural nouns. The lexical plurality of berries should be fairly obvious—one berry a meal does not make and the berry bush that makes just one berry is waste to the owner. Similar to these is *gronyn* (pl. *grawn*), a word which means 'a grain of corn', 'a fish egg or a berry'. The plural is used where English says 'roe'. Aside from the resemblance of the corn and fish eggs to berries they also possess lexical plurality in their own right and should be of this category in any event.

Blodeuyn 'flower' is a short plural noun. Its plural, *blodau*, is the bare stem while the singular shows affection of the penult from *au* to *eu*. While flowers themselves may qualify for lexical plurality, apparently most individual kinds of flowers do not. This is not odd however when one considers that many types of flowers occur singly or infrequently, unlike trees, which come in groups. Most of the types of flowers which occur in large groups do in fact end in *-en* or*-yn*. A strange exception to this rule, if extended to all plants, exists—duckweed, a common water weed that comes in large numbers of tiny lilypad-like leaves, is not of this form. Its name is *bwyd yr hwyad*, but this is literally 'food of ducks'.

Three words illustrate the effect of lexical plurality in the formation of this noun class with nonanimant referents. These words are *bribysen* 'bit or fragment', *bricsen* 'brick', and *briwsionyn* 'crumb'. The plurals are *bribis*, *brics*, and *briwsion* respectively. All of these occur in quantity, a single brick is seen less often than many bricks and with bits and crumbs the lexical plurality is even more obvious. What is even more interesting with *brics(en)* is that when it was borrowed the plural form of the English word was used as the stem. There is a trend now to use the 'proper' English form *bric*, but the older borrowed forms are still used by many speakers; *Y Geiriadur Mawr* does not even list *bric* as a form and gives *bricsen* as the correct singular form. That Welsh borrowed the plural form of bricks as *brics* but did not borrow the singular, lends credence to the idea that the plural of this word is somehow unmarked, as do the terms in table 1 that incorporate English plural endings in their stems.

Some other inanimate words display short plural formation (see table 2). The Welsh words for lightning, *llucheden/lluched* and *mellten/mellt* are interesting, when compared to English. One does not say 'I heard *a* thunder and saw *a* lightning' as thunder and lighting are noncount in English. Similarly the term *thunder storm* does not imply the existence of just one clap of thunder in the storm; the expression of true lexical singularity requires the coupling of *thunder* with a word that carries singularity with it, e.g.; a *clap* or *peal* of thunder or, similarly, a *burst* or *flash* of lightning.

One interesting word is a compound of *crach* 'scabs'; *crach y môr* 'barnacles' are literally 'scabs of the sea'. Barnacles, as they occur in dense mats, are a perfect example of lexical plurality.

There are some examples of change with this type of words. At least one word has felt the pressure to conform with more standard ways of making plurals. There is an archaic plural *difer* 'drops' with a singular that appears to be of this group, *diferyn*. There are currently two equivalent plurals for *diferyn*. The first of these is *diferynnau*, a perfectly regular plural. Alongside *diferynnau* is *dyferion*, consisting of the stem represented in the archaic plural *difer* plus

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-ion. The singular still bears the characteristic *-yn* ending of short plural singulars.

There are actually quite a few nouns which substitute plural for singular terminations—in all cases the singulars end in *-en* or *-yn* and, although these words are not considered here, the reason seems to be the same—the noun in question possesses lexical plurality. Some examples are *cwningen* (pl. *cwningod*) 'rabbit', *miaren* (pl. *mieri*) 'bramble', *cerdyn* (pl. *cardiau*) 'card', and *cerpyn* (pl. *carpiau*) 'rag' (Williams 1980:14).

Gwenithen is a 'grain of wheat' while *gwenith* functions where English uses 'wheat'. Also of the same nature are two word pairs, *gweiryn* 'blade of grass'/*gwair* 'grass' and *gwelltyn* 'piece of straw or grass'/*gwellt* 'straw'. One compound of *gwellt* shows the same formation except the gender of the compound is feminine while *gwelltyn* is masculine. This is *glaswellt* 'green grass'. The word for a blade of green grass is the feminine *glaswellten*. (The loss of the initial *g* in *gwellt* in compounding is a mutation of *g* and is entirely regular).

A few terms referring to the human body are also of this nature. *Mân-wythïen* 'capillary' has a plural form *mân-wythï* and the archaic *monoch* 'entrails' is singular in *monochen* (in English the plural is always used). One word which provides cogent evidence for regarding the plural as being unmarked in the cases of nouns with lexical plurality is *gwythi* (the same word as the second part of the word *mân-wythi*). This means 'veins' or 'muscles,' while the singular *gwythïen* is restricted in meaning to 'vein'. A regular plural, *gwythïenniau*, exists but its meaning is more marked than *gwythi*—as with *gwythïen* the referent is limited only to veins, muscles being out of its scope of meaning. Such a restriction in meaning and usage is typical of the more marked term in a pair.

Some types of fish, but not all, are lexically plural. As analyzed above, *pysgoden* is a fish and *pysg(od)* are fish. *Pilcod* 'minnows' (sing. *pilcodyn*) are interesting in that they also bear a plural ending in the stem, as does *pysgod*. Fish that do not travel in schools do not have short plural forms. For example a lobster (although not really a fish), *cimwch* (pl. *cimychiad*), is an animal which would not be lexically plural and it does not show the form of lexically plural nouns.

Children themselves are lexically plural. The same is true in English; through a mechanism similar to the one under consideration here *children* was formed as a so-called double plural—*child* plus the plural suffixes *-er* and *-en*. Welsh children are *plant*, no pun intended by the Welsh; a single child is a *plentyn*. Here *plant* is clearly the stem as *plentyn* shows the stem vowel change (*a*~*e*) characteristic of inflected forms.

Similarly, in Norwegian the word for child, *barn*, shows a fairly unusual plural formation used for neuter monosyllables; where most words add *-er* to form the indefinite plural and *-ene* to form the definite plural, the indefinite plural of *barn* is the same as the singular—*barn*—and the definite is formed by addition of *-a*, *barna*. This is a very marked plural construction in Norwegian. Other words which show this construction may also tend to be lexically plural: *agn* 'bait', *bild* 'picture', *berg* 'mountain', *ord* 'word', *folk* 'folk or people', *sted* 'place' and *stol* 'chair' among many others.[1]

Feathers, *plu*, and 'feathers of snow', or snowflakes, *plu eira*, are both lexically plural items and the singulars are *pluen* and *pluen eira*. Stars also are lexically plural—*sêr* are the stars, and *seren* is a star.

From the examples given above, the lexically plural nature of the referents indicated by Welsh short plural nouns should be evident. The preceding evidence would give strong enough support for viewing this situation in Welsh as being a instance in which the unmarked plural represents the stem and the singular is formed by suffix addition, but the nature of the suffixes themselves may provide equally cogent reasons for viewing this as the case.

3.3 THE SINGULAR SUFFIXES. One of the strongest supports for this hypothesis lies in the nature of the singular endings *-en* and *-yn* which function as singular endings in short plural nouns. Although not traditionally regarded as such in this case, the endings can be productively analyzed as diminutive endings. When added to certain stems *-yn* functions as a masculine diminutive ending (e.g., *bachgennyn* 'lad,' formed from *bachgen* 'boy'). This particular diminutive ending appears to be used primarily as a diminutive with nouns that are lexically plural, but which do not show short plural formation, as in *golwyth (-ion)* 'cutlet', which has a diminutive *golwythyn*. Morphologically these diminutives are indistinguishable from singulars of short plural nouns. In addition to *-yn* as a diminutive ending there is also the masculine diminutive ending *-cyn*. The ending *-cyn* functions once in the list as a singular ending (in *celficyn* 'tool,' *celfi* 'tools'). Both singular endings of the masculine nouns are identical then to diminutive endings. The feminine is a bit more problematic. The singular ending *-en* is not a normal diminutive ending in Welsh, but a number of factors would indicate that the singular *-en* is in fact a diminutive ending. The first of these is the existence of the feminine diminutive *-cen* (e.g., *ffolcen* 'small foolishness' from *ffol* 'foolishness'). The existence of *-en* could then be supposed by analogy to the *-yn/-cyn* endings of the masculine.

The second factor supporting the analysis of *-en* as a feminine diminutive is the system of vowel alternations with which Welsh marks gender. The alternation of *y* and *e* as markers of grammatical masculinity and femininity respectively is well established in Welsh. Take for instance the adjective pair *gwyn* 'white–masculine' and *gwen* 'white–feminine'. Here the alternation of *y* - *e* makes the distinction in gender of the adjective forms. Many adjectives follow this pattern and the short plural nouns show this distinction clearly. Thus the nature of *-en* as a feminine diminutive could be strongly posited as showing the masculine~feminine vowel distinction even if *-cen* as a feminine diminutive did not exist.

Analysis of *-yn* and *-en* as diminutives makes their function as singular endings clear. In Jakobsonian terms the invariant function of the diminutive suffix is to reduce the scope of the referent to which it is applied. Thus, a diminutive would either make the individual items encompassed by the plural smaller or to somehow make the plural itself smaller. According to this view *-yn*, *-cyn* and *-en* indicate that their referents are to be made smaller; how this is to be seen depends on the context in which the ending occurs.

There are plural diminutives (*-ach* and *-os*) which make the individual items contained in the plural smaller. This type of ending can even be applied to nouns of the type in question, e.g., *plantos* 'little children'. If regular plural diminutive endings can be applied to make the individuals of the plural smaller then the addition of a standard *singular* diminutive ending to a plural stem would do something else—it would make the plural itself somehow smaller.

In the case of a lexically plural item one way of making it smaller is to make it singular (i.e., to reduce its referent from many items to one), and that is what the singular endings do in this case. By the application of a diminutive ending to the stem of a lexically plural noun its meaning is rendered singular. In short the use of the singular endings is to make the plurals singular by diminutizing them. The meaning of the diminutive ending can be seen to have been preserved, even in a decidedly unusual setting.[2]

4. CONCLUSION. The examples in English, Frisian and Norwegian given in the body of the paper show that the phenomenon of 'short' plurals in Welsh is a manifestation of an underlying principle which is responsible for irregular plural formation in many languages. Welsh shows a very strong manifestation of this markedness-related principle. At first look the problem of short 'anomalous' plurals in Welsh seems to violate some linguistic strictures about the relationship between singular and plural forms in language. However a close examination of the situation in terms of lexical markedness reveals that these words conform to a deeper principle. This principle underlies both the formation of normal plurals (most terms are lexically singular) and the formation of singulars from plurals. This underlying principle (for Welsh) can be stated in the following manner: the less semantically marked a term is in a singular-plural pair, the more likely it is to represent the stem, regardless of whether the term is singular or plural, while the more marked term will be iconically produced from the unmarked term by overt marking.

In short, these forms do not indicate a historical leftover or unexplainable problem. By close examination it can be seen that they are quite rule-bound and conformative. It is also apparent that traditional explanations about loss of an ending to form the plural are backwards. Only by an examination of the lexical markedness of these words can the pattern become apparent and this facet of the grammar be seen as logical and not merely arbitrary.

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[1] In the case of Norwegian (and most other Indo-European languages) I suspect that the situation with neuter nouns is considerably more complex than what I have presented here and that semantic considerations in addition to lexical plurality come into play. For example *sted* and *stol* do not seem particularly lexically plural to me. However, the frequent co-ocurrence of lexical plurality with certain other semantic features in the neuter may have led to the extension of the singular-plural neutralization to those neuters which would not have lexically unmarked plurals. I believe, although I have not yet done research on this, that the neuter carries semantic loading that indicates its referent is *semantically a non-agent*, regardless of its grammatical role. This would account for the universal Indo-European syncretism of nominative and accusative in the neuter (with a strong tendancy for both forms to be superficially accusative). This feature would also tend to co-occur with lexical plurality since non-agents would often be the sorts of things discussed in terms of lexical plurality in this paper. Thus this particular lack of singular-plural distinction in Norwegian might very well be motivated in the manner described in the text, even if the motivation is indirect in some cases. This, however, is conjecture at this point, and only further research would bear this hypothesis out. For a discussion of case usage that bears some resemblance to my hypothesis, see Jakobson 1990:332–85 (especially 345–46).

[2] Although a weaker explanation, the similarity of the endings *-yn/-en* to *un* 'one' is worth note. It may be that this similarity would tend to reinforce the interpretation of these endings as indicating singularity when applied to short plural nouns.

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II. NEUROLINGUISTICS &
PSYCHOLINGUISTICS

SEMANTIC SPECIFICATION / SEMANTIC EMERGENCE: AGAINST THE *CONTAINER* METAPHOR OF MEANING

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THE QUESTION OF POLYSEMY, and what to say about it, is a continuing problem for semantic analysis. It is often the case, however, that contention over apparently competing analyses arises from a pervasive misconception that has long been prevalent in linguistic thought, and which is often called the 'container metaphor' of meaning. Simply put, this is the notion that lexemes contain meaning, and hence that the meaning of an utterance must be able to be componentialized and exhaustively assigned to its individual lexemes. Such an idea is unrealistic when considered from any plausible neuro-cognitive standpoint, and this paper will demonstrate quite the converse of that position; namely that certain conceptual associations may depend on the coactivation (i.e., the linked perception) of certain pairs or sets of lexemes, and while such concepts may clearly be part of the understanding of certain lexemes in particular contexts, they need not be attributed directly to any single lexeme in the usage event.

Large areas of the richly interconnected network comprising our neurological structure play a central role in linguistic semantics, and while it is certainly true that lexemes will have strong conceptual links that comprise their most immediate or 'core' semantics, the nature of a neural network is such that each and every lexeme is indirectly connected to one's entire inventory of linguistically relevant concepts—these two facts representing endpoints on a continuum of connective primacy along which there are no sharp discontinuities.

In this view, an element of meaning analyzable in a particular usage event may arise from the coactivation of two or more lexemes in the string, and not itself be separately attributable to any of them. Certain concepts will hence achieve activation as a result of combinations of other concepts, and as such can be seen as 'emergent' or second-order aspects of meaning.

A CLEAR, if unexpected, example of the container metaphor can be seen in Lakoff's 1987 treatment of the lexeme *over*, as found in *Women, Fire, and Dangerous Things.* In 'Case study 2' in this work, Lakoff distinguishes two positions on the question of polysemy, which he calls the *minimal specification* *interpretation*, and the *full specification interpretation*. The former he characterizes as an interpretation in which only one lexical entry, or *schema*, for the polysemous term exists in the minds of speakers. Leaving aside for the moment the details of what a 'schema' is, under the minimal specification interpretation it contains a bare skeleton of semantic information such that it is compatible with the entire range of the lexeme's polysemy, all extra information being provided by other lexemes in any given construction (Lakoff mentions specifically the object and the verb in the case of a preposition like *over*).

This position is rejected by Lakoff for giving rise to semantic specifications of such vague abstraction as to be non-distinctive. He proposes the *full specification* alternative, in which many schemas coexist in the speaker's mind, all linked to the same phonological string. In his analysis of *over*, he proposes 24 schemas, varying in minor detail from one another, and represents them in a 3-dimensional interconnected network (Lakoff 1987:436, fig. 27). He thus sets up a dichotomy between what seem to be two different views of how information is organized in the cognitive system. Significantly, however, both of these alternatives are treating 'schemas' as bounded structures, and as such, both are falling foul of the container metaphor. We will see below that a more realistic view of the architecture of the system subsumes both of these positions, flattens the distinction between them, and throws more light on the possible organization of linguistic meaning.

THE MAJOR PROBLEM with Lakoff's argument, from its very point of departure, is an apparent reification of the 'schemas' to which he refers, such that they take on the status of underspecified, related, but essentially discrete lexical entries. The results of such a reification are evident throughout the discussion in comments such as, 'Since schema 2 requires no contact, *it cannot be present* in those cases where contact occurs...' (ibid. 425, my emphasis). Dirk Geeraerts has summed up the problem neatly saying,

> ...network models tend to be misguided by their own spatial form. If you start from a model that takes its starting-point in point-like elements (meanings) connected by lines, then of course you will tend to think of those meanings/points as stable elements. (In philosophical parlance, I'd say there is a tendency to 'reify' them—to consider them as things).
> [Posted on FunkNet, 30 November 1995]

Such a model is precisely what Lakoff presents, his 'point-like elements' being schemas. In order to understand why it is an error to reify such structures, we should here briefly consider the notion of 'schema' in more detail.

A (lexical) schema is usually characterized as some kind of abstract categorizing structure in memory—a semantic or conceptual 'template' extracted from all usage events of a lexeme. In this interpretation of cognitive architecture, experience of an input progressively builds and refines its own template, such that experience will constantly modify conceptualization. The term 'lexical' above is bracketed, as schemas can in fact be extracted from any kind of sensory input and need not have anything to do with language. Here, however, we are considering the kinds of schemas that are specific to linguistic semantics.

But even a characterization such as this is running close to reifying what can only be realistically seen as an ephemeral coactivation of entrenched connections in a network. Schemas are patterns of activation spread across many different nections. They are an explanatory device that accounts for the results of particular inputs in terms of the connectivity of the network. The schema doesn't 'exist' in any separable sense—it is a combined result of activation and particular connectivity characteristics. Similar or related schemas thus share a great many nections or, in other words, involve many of the same neural structures. Seeing two different schemas (belonging to the same lexeme) as discrete memory structures is the error that I am here labeling the container metaphor. From McClelland, Rummelhart et al.,

> One important difference between our interpretation of schemata and the more conventional ones is that in the conventional story, schemata are stored in memory.... In our case nothing stored corresponds very closely to a schema. What is stored is a set of connection strengths which, when activated, have implicitly in them the ability to generate states that correspond to instantiated schemata... (1986, vol. 2:21)

McClelland et al. here acknowledge the ephemeral nature of schemas and suggest a probable high degree of functional overlap between the individual elements (nections, sets of nections) of what might be identified as different schemas. The differences between schemas amount to peripheral activation of slightly different micro-sets of units in an otherwise like pattern, and modification of such structures occurs as the result of incremental activation-driven weight modifications of individual synapses. So, in a system with a number of related schemas proposed, activation of any one of them is in fact activation of the vast majority of all the rest of them at the same time. In examples such as the one drawn from Lakoff, this fact is obfuscated by the representational system.

To see how it is possible to avoid this problem altogether, let us first consider an abstract example, followed by a reanalysis of part of the polysemy of *over*. A particular concept (used in its broadest possible sense, and irrespective of its degree of complexity) is a neural event, involving very large numbers of individual neural activations in a highly interconnected pattern. The

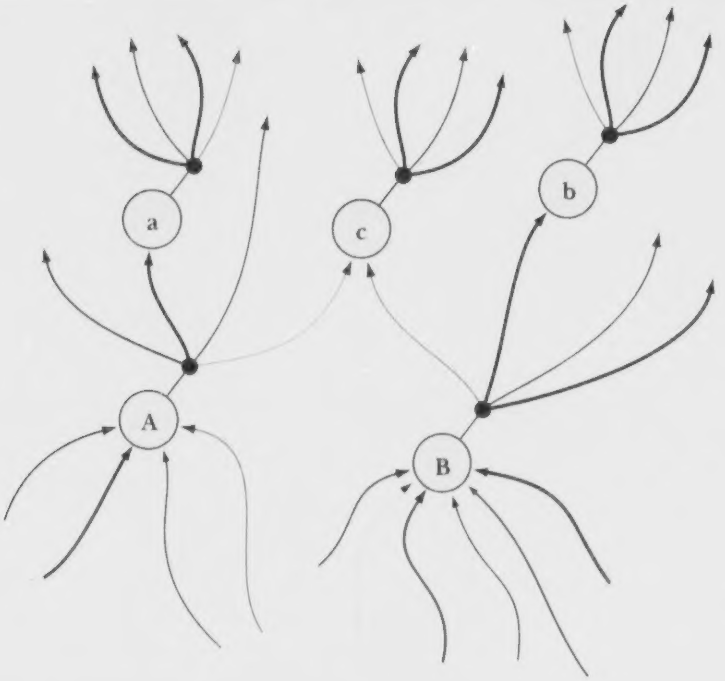

Figure 1. (See text for explanation)

apparent discreteness inherent in the term 'concept' is in fact a little misleading, as the activation referred to does not consist of bounded quanta, but is essentially a continuous flux. Nevertheless, in the interests of simplicity, the activation patterns that comprise concepts will be spoken of here as if they were discrete and bounded events. Using the expanded relational network notation of Lamb (ms.), we can thus represent a pair of concepts, abbreviated as single nodes, with a few of their respective interconnections shown (fig. 1). Here we have two putative 'concepts' abbreviated as single nodes (*A* and *B*). The varying weights of the connecting lines represent relative connectivity strengths to downstream nodes (*a*, *b* and *c*), which themselves may be seen as related concepts that receive activation under certain conditions. When *A* fires, sending activation along all of the lines emanating from it (in an upwards direction on the diagram), its strong connection to *a* is sufficient to activate *a* as well, assuring that the two nodes (*A* and *a*) will always be coactivated, but the weaker activation to *c* is insufficient to cause the subsequent firing of that node. A similar coactivating relationship exists between *B* and *b*, but again *B* alone is insufficient to fire *c*. So, if either node *A* or *B* fires in isolation, the upstream node *c* will not fire. If both *A* and *B* become active simultaneously, however, then their combined activation is sufficient to activate node *c*.

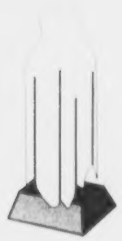

Figure 2. *There is a cloth over the statue.*

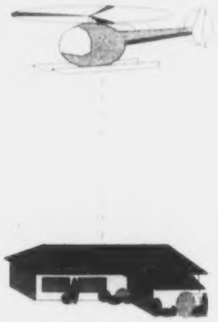

Figure 3. *There's a helicopter over the house.*

Precisely the same mechanism can operate irrespective of the degree of complexity of the structures involved. If we allow each node in Fig. 1 to represent some manner of 'semantic atom'—an element of meaning or concept—then what we have is the basic mechanism that allows that certain elements of the meaning of a poly-lexemic string might not be able to exhaustively associate with any of its particular lexemes, but may rather emerge from the coactivation of aspects of their individual semantic entailments.

The point can be given concrete demonstration by considering the preposition *over* in two different contexts where at least one element of meaning differs. The example sentences to be considered are

1. a) There's a cloth over the statue. [fig. 2]
   b) There's a helicopter over the house. [fig. 3]

Lakoff sets up two different sets of schemas to account for the fact that in examples like fig. 2, the trajector is in contact with the landmark, while in fig. 3, there is no contact. He thus requires that some notion of CONTACT be present in one set of schemas, and the notion NON-CONTACT in the other, and furthermore that these notions are specifically part of the semantics of different reflexes of *over.*

This is unnecessary, as a single relatively simple network structure of the kind outlined above (Fig. 1) can account for both of these usage events, without forcing any but the most basic concepts to actually 'belong' to particular lexemes, and without requiring any polysemy.

THE EXAMPLE SENTENCES are existential locative predications that essentially contain three major content words each. These three words, in Langackerian terminology are a relation (the preposition *over*), a trajector (the focus of the

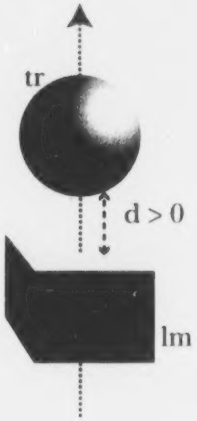

Figure 4. The spatial *over* relationship

existential predication), and a landmark (the object of the preposition). Although all of these elements will obviously contribute to the full semantic content of the string, for the purposes of this demonstration, the only semantic elements that need occupy our attention are the trajectors and the relation.

In the case of the trajectors, they are both physical objects, and here only one distinguishing feature is important—helicopters are able to hover, while sheets, like most other objects are not.

As for the relation itself, spatial *over* can be characterized as a relationship between a trajector and a landmark, where the landmark has some natural orientational axis (prototypically vertical, as a result of gravity, although other axes are possible with objects that have some kind of human interface, such as televisions, computers, ovens, and indeed the human head). The relation specifies that the center of the trajector is also more or less aligned with the landmark's axis and, further, as that axis projects out from the landmark on two opposite sides, that the trajector is located on the *superior* extent of the axis—where *superior* can be understood to refer to the *top* of objects whose orientation is defined by gravity (objects that can meaningfully be said to be 'upside down'), and to the front of objects whose axis is defined by functional interaction (objects that can meaningfully be described as 'reversed', 'around the wrong way', or 'back to front' in some dialects of English). The distance between the trajector and the landmark is prototypically nonzero (the zero case being better expressed with *on*); however this specification can be easily overridden, as we shall see.

The semantics of *over* can hence be shown diagrammatically as in Fig. 4. This complex specification will henceforth be abbreviated simply as a node labeled SUPERIOR.

The concepts that must be allowed to emerge from the activation of those already listed are ABOVE (evident in (1)a.), which entails NONCONTACT; and COVERING (evident in (1)b.), which entails CONTACT (and many other things, which will not be considered here). A network structure capable of producing this outcome is given in Fig. 5. Some explanation of this diagram follows.

The shaded circles are nodes, functionally comparable to the nodes of older forms of Stratificational Grammar (cf. Lockwood 1972). They represent points of convergence in a network, and they all have activation thresholds. Many simplifications have been made in the current representations, one of which is the nature of the threshold values. Nodes with no numbers have thresholds of 1, meaning that any input will activate them. Other nodes are shown with whole number thresholds, in this case basically corresponding to the number of inputs. This is a gross simplification of the actual threshold behaviour of neuronal systems, but is sufficient for the purposes of demonstration. The entire structure, and all diagrams in the notation adopted here, are monodirectional. Activation can flow only outwards from any node, along the short spine that terminates in a small black circle. These black circles represent branching points in output lines, and another simplification that has been made is to omit any connection that is not directly involved in the demonstration. Each branching point can potentially sustain any number of output lines. The forked structure emanating from the branching point above the node 'ABLE TO HOVER', and intersecting one of the output lines from the node 'OBJECT', is a 'blocking node'. It is a structure that interrupts the output activation of the line it intersects, preventing the activation from going any

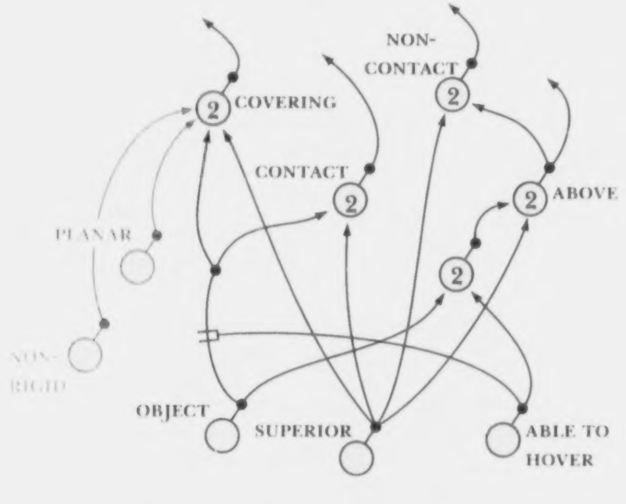

Figure 5. Simple network structure

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further. Such structures have a neuronal correlate in inhibitory nodes that synapse directly to axons ('axoaxonic synapses' cf. Brodal, 1992:32). The faint nodes indicated to the left of the diagram are included to reiterate the point that there is obviously more involved in the full structure of such concepts, but that it has simply been omitted here for clarity. To show how the proposed structure is intended to operate, let us trace the activation path of the string 'There's a cloth over the statue'.

Fig. 6 shows the initial evocation of the concepts directly activated by the perception of the string (activation flowing up from perceptual input nections further downstream, and not indicated on the diagram). Activated lines are drawn more heavily. None of the nodes initially contacted have threshold numbers indicated—they all have thresholds of 1—and as such the input shown will successfully activate all four of the nodes contacted.

At the second stage, as illustrated in Fig. 7, the nodes labeled OBJECT and SUPERIOR, having had their respective thresholds satisfied, have fired, spreading activation upwards through the structure. Node activity is indicated using heavier lines and darker shading. All higher nodes in this network have threshold values of >1. Continued activation now depends on more than one

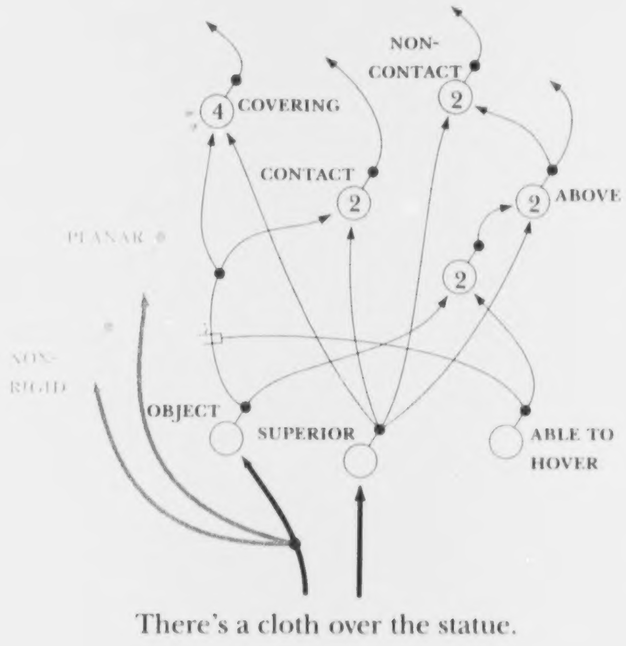

Figure 6. Initial activation

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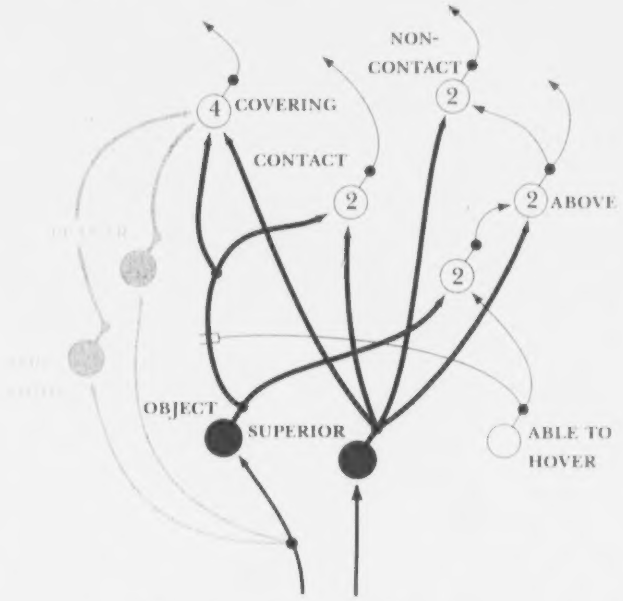

Figure 7. Stage 2 activation

input. The node labeled 'COVERING', with a threshold of 4, is indeed receiving 4 inputs. This satisfies its threshold, guaranteeing that it will fire (see fig 7). Note that pathways do not immediately 'switch off' once they have fired, but rather their activation fades more slowly (the links shown as active in fig 6 are still heavier than the inactive pathways). This is intended to remind the reader that neural activation does not propagate in quantum-like steps, as the chosen method of illustration seems to indicate, but is a rather more organic process, with neurons taking a little time to return to their rest state. It also allows that a particular node's threshold need not be reached exactly simultaneously by summed inputs, but that those inputs can be slightly staggered and still successfully activate the node.

At the third stage (fig 8), only the upper nodes whose thresholds have been completely satisfied will fire, allowing that only the higher level concepts COVERING and CONTACT achieve activation in this context, and thus that only they participate in the comprehension of the perceived string. The conceptual nodes ABOVE and NON-CONTACT are latent, and hence play no part in the understanding of the given string. This is congruent with the conventional meaning of the string, as diagrammed in fig 2.

Also omitted from the preceding diagrams, but probably desirable in a more detailed treatment, are mutually inhibitory connections between CONTACT and NON-CONTACT, and also perhaps between ABOVE and COVERING.

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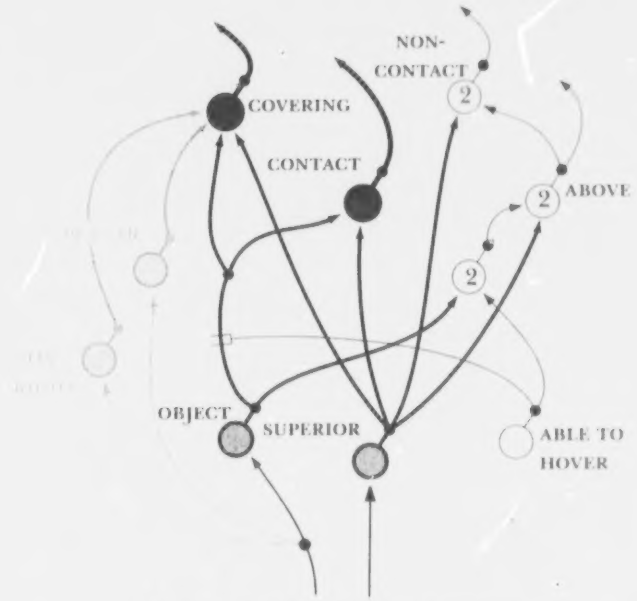

There's a cloth over the statue.

Figure 8. Stage 3 activation

Such an inclusion would accord with the contradictory nature of such conceptual associations (particularly CONTACT/NONCONTACT), but has not been included, as it is not actually necessary in this case to get the network to behave as desired. As the degree of complexity of such network models increases, so does the necessity for including mutual inhibition as a mechanism. Mutual (or 'lateral') inhibition, it should be noted, is a very common neuronal relationship, particularly in the cortical sensory regions, but also more generally throughout the cerebral cortex (cf. Brodal 1992:163).

Figs. 9 to 12 show the activation pathway for the second string, 'There's a helicopter over the house'. These diagrams are identical in form and function to those already given: all that differs is the pathway, which is still easily traceable. Clearly, this same network in the second case produces the opposite outcome, where the conceptual nodes NONCONTACT and ABOVE participate in the comprehension of the string, while those for COVERING and CONTACT are dormant.

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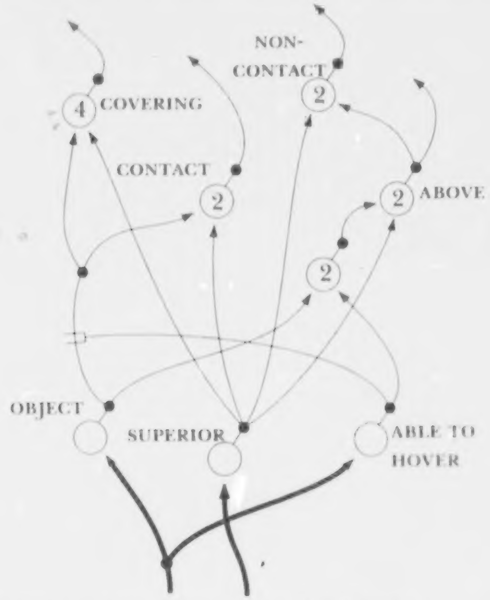
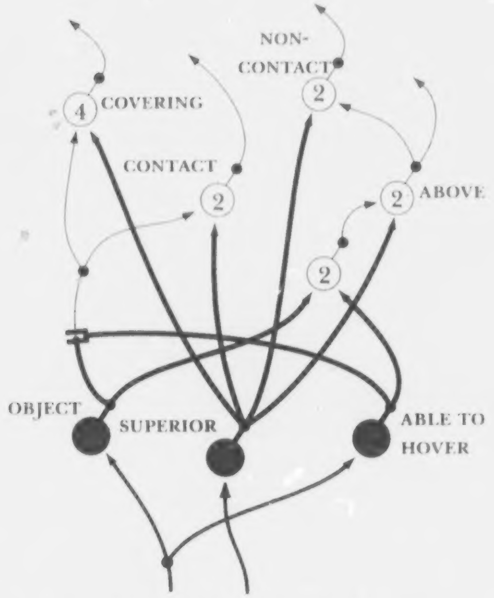

NON-
CONTACT
2
4
COVERING
CONTACT
2
2
ABOVE
2
OBJECT
SUPERIOR
ABLE TO
HOVER

There's a helicopter over the house.

Figure 9


NON-
CONTACT
2
4
COVERING
CONTACT
2
2
ABOVE
2
OBJECT
SUPERIOR
ABLE TO
HOVER

There's a helicopter over the house.

Figure 10

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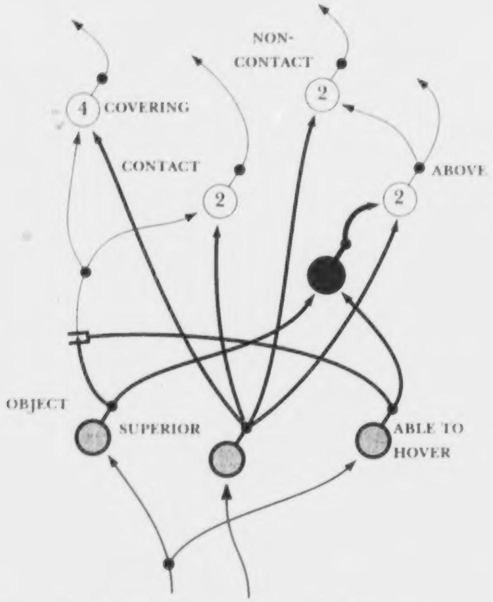
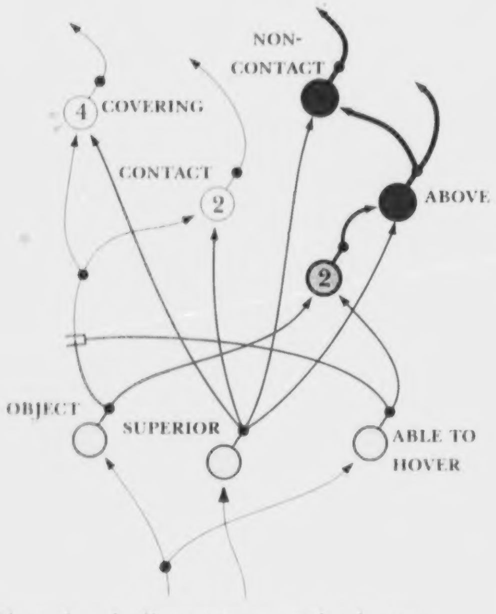

NON-
CONTACT
4
COVERING
CONTACT
2
2
ABOVE
2
OBJECT
SUPERIOR
ABLE TO
HOVER
There's a helicopter over the house.

Figure 11


NON-
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COVERING
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ABOVE
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OBJECT
SUPERIOR
ABLE TO
HOVER
There's a helicopter over the house.

Figure 12

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THIS DEMONSTRATION illustrates several things. Firstly, a network analysis such as the one presented is able to account for the linguistic data using a connectionist model that does no violence to what is known about neural connectivity and is thus a credible *neurocognitive* model. In addition, it provides an elegant account of the phenomenon of polysemy without forcing a choice between full and minimal specification interpretations such as those set up by Lakoff (1987). This distinction is clearly unnecessary and is an artifact of erroneously perceiving schemas as distinct memory structures—an instance of thinking in terms of the container metaphor. The alternative presented here allows that certain elements of meaning can be 'emergent' in the sense that they need not be directly specified by any of the lexemes in a string, but arise as a result of the coactivation of two or more lexemes in a given context. They thus belong to the whole usage event, rather than any of its parts taken individually. The real issue here is one of *boundary phenomena.* To ask the question 'Where does this semantic element belong?' is to require clear boundaries between the semantic structures of separate lexemes. Many branches of science are now converging on the conclusion that boundaries rarely if ever occur in any natural systems and are rather an artifact imposed by the observer. Arguments over boundary phenomena have no place in a realistic cognitive model, and modernizing the argument using words like *schema* and *cognitive* does not automatically release the analyst from longstanding and limiting misconceptions.

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BIDIRECTIONAL PROCESSING AND EXPANDED RELATIONAL NETWORK NOTATION

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TO BEGIN WITH, let me emphasize that relational networks are based on linguistic evidence. They were arrived at through a process of analyzing relationships among linguistic units, and it was found that if these relationships are fully accounted for, as can be done with the aid of a notation developed for just this purpose, then the linguistic units which had theretofore been thought to have some existence as objects of some kind (such things as lexemes and morphemes and phonological features) turn out to be nothing more than locations in a network of relationships (Lamb 1971). This proposal was put forth some thirty years ago (Lamb 1966), before the field of neurolinguistics had been given that name, before the field of cognitive linguistics had been named (that didn't happen till 1971), and, of course, before the recent interest in connectionism in cognitive psychology. Starting from a building-block approach, I was analyzing the relationships among units like morphemes and phonemes, using a system of network notation adapted from that of Halliday (e.g., 1973), and I discovered that if we recognize the relationships among what seem to be various 'building blocks' and identify them with a graphic notation, the result is that we find them interconnected in a network of relationships; and then we find that there is no longer any need to consider those units as having any real existence other than locations in the network (Lamb 1971). It then became apparent that by letting activation spread through the various lines and nodes of the network according to the varying requirements of different node types, it seemed to be possible to account for the processes of speaking and understanding—although there are very complex problems to solve in working out the details of these processes. Further study of the processes has led to the need for modifications in the network model, and some still unsolved problems of processing will no doubt lead to further amendments.

The structure of the relational network is thus dictated by the requirements of accounting for linguistic data and linguistic processes. The fact that the linguistic system is a network comes as the conclusion of a process of analysis, not as a result of examining neurological evidence. Whatever resemblance they have to neural networks thus comes as a happy surprise, not as a consequence of using information about neurons in their design, as neurological information was not considered.

Yet from the earliest days, back in the sixties, various people have been asking if there is any resemblance, while others have pooh-poohed any such idea, shocked that anyone might even *suggest* it. But it is not a question just to be dismissed; it needs to be asked. Since the relational network emerges from an honest attempt to understand the nature of linguistic structure as it is used by the human being, and as that structure must surely be somehow represented in the brain, then there *must* be *some* relationship. Our curiosity in wondering about that relationship is surely healthy.

Some attempts have begun during this 'decade of the brain' to see what relationships might exist between relational networks and neural networks (Lamb 1994). Upon looking at neurons and comparing what is known about neural networks with relational networks, one finds several basic correspondences, including properties of the hierarchical structure; but one is also immediately struck by an obvious difference: Neural fibers transmit activation in one direction only, but the lines of relational networks are (in general) bidirectional. This point, discussed in a recent LACUS presentation (Lamb 1994), looms as important in itself only to those who are unaware that there is also an expanded relational network notation in which all lines and nodes are one-way (Christie 1977, Lamb 1980). This expanded notation resulted from analyzing the nodes of the original relational network notation in an attempt to account for how they evidently need to behave to make speaking and understanding possible.

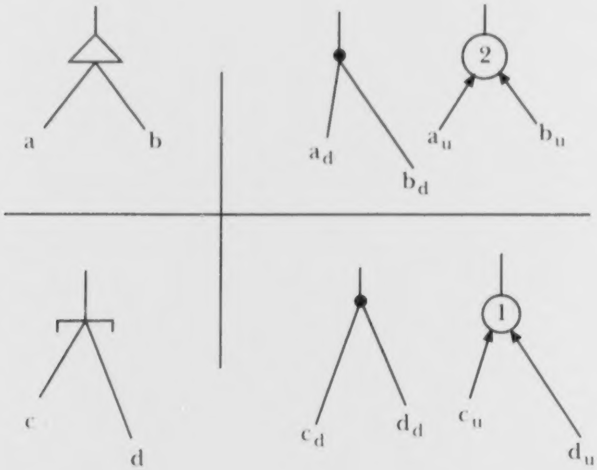

Figure 1. Some basic nodes in condensed and expanded notation

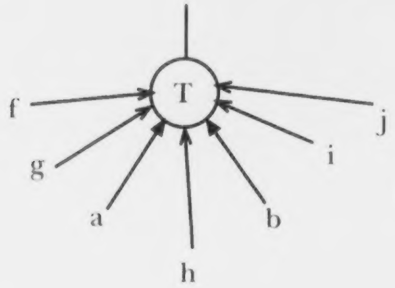

Figure 2. Latent vs. established connections

Figure 1 shows the simple (unordered) AND and OR nodes in the two versions of the relational network notation. The number written in the node is an indication of the threshold—a threshold of '2' is satisfied if both incoming lines are active. The subscripted 'd' and 'u' indicate the downward (toward expression) and upward (toward meaning) directions, respectively.

Using the expanded notation is like drawing a map to a smaller scale, allowing us to show more detail. One kind of additional detail is the difference between established connections and latent connections (Figure 2). The practice in using the condensed notation has been to show only established connections. Accordingly, one has the right to ask how those connections, which may look as if they are 'hard-wired', got there. The answer is that they (the established connections) have been selected, in a learning process, from among a much larger number of latent connections.

We may identify the main elements of a relational network in the following terms:

1 The elements of the network are lines and nodes, and there are different types of nodes (and connections of lines to nodes can vary in strength).
2 At the next level or organization, we have nections, each made up of lines and nodes (Figure 3). The term nection is based on connection (Lamb 1984).

The nections are the modules which are connected together to form a network. Although in the development of this model the nection was arrived at on the basis of purely linguistic evidence (Lamb 1971, 1994), its major properties turn out to resemble those of the neuron, highly simplified but not as much so as the 'neurons' of some neural network models. Nevertheless, we have no evidence (beyond this resemblance) for supposing that a nection corresponds directly to a neuron; on the contrary, it is more likely that each nection corresponds roughly to a group of neurons, perhaps to a cortical column.

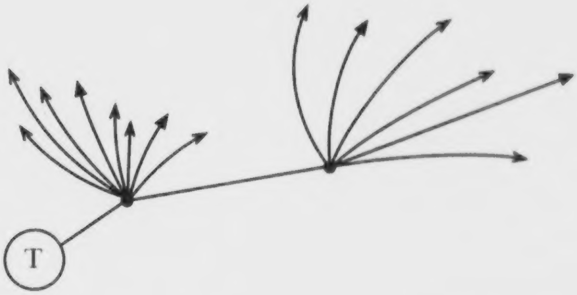

Figure 3. A nection with latent and established feed-forward connections

We assume, as a working assumption for the current state of the model, that the initial state of the network includes all the nections that will ever be needed. Based on what we know of the general abundance of redundancy and proliferation in biological systems we may assume that there will be many more connections than will ever be needed for the learning a person will be able to accomplish during a long lifetime. Learning is, in effect, the establishment of connections: 'In effect'—but in accordance with the foregoing, this effective process is accomplished as the *selection of connections to strengthen*, among the abundant collection of available potential connections. The profuse connections of the initial state, then, are very weak connections. Certain subsets of them, selected in the learning process, become strengthened. Likewise, any nection which has as yet only such weak connections to other nections is a LATENT NECTION—not yet dedicated to any specific function. For example, by its location in the network a nection may start out in life as being available to learn a morpheme in a language—any of a wide variety of morphemes in any language—and it may or may not some day be recruited to serve for some specific morpheme, say *banana*, by virtue of getting connected to specific other nections, the means of getting connected being the selection of certain of its many available weak connections for strengthening.

Learning is a process of selectively strengthening weak connections of LATENT NECTIONS—i.e., RECRUITING nections for new functions—and of effectively adding new connections to existing nections by raising their strengths from near-zero to a higher level. The cognitive system has to be assumed to be very adept at such recruitment, for example the recruitment of high-level lexical nections for complex lexemes, both for those it has received and for those it makes up on the analogy of those it has received. After a nection has been recruited for some function, it is a DEDICATED NECTION.

How does it all happen? We can start with a very simple hypothesis and see how far it will take us. Let us suppose that any connection will get strengthened—including an already established connection, which can get further strengthened—*if it is activated at about the same time as the node to which it is connected is receiving enough activation to have its threshold satisfied* and that threshold is thereupon raised. If *all* the incoming connections of this nection were previously latent, it has now become a dedicated nection.

But from this same process it follows that a nection, once recruited, is nevertheless not fixed with respect to what it will respond to, since it can thereafter have its threshold satisfied by a somewhat different set of incoming connections from those which caused it to be initially recruited. For example, if a nection learns to respond to three properties A, B, C, in the first instance, then is later satisfied by sufficient activation from properties A, B, and D, it will have learned to respond to

A and B and (C or D) .

After further experience it may learn to respond, in varying degrees, to a much more complex combination of features of varying strength (such that a simple formula like that above could no longer be written). The central nection for a concept or visual image will normally come to represent a category rather than a single object, since it will have learned to be satisfied by a *sufficient amount* of activation *from among* all its 'parent' properties, as determined by its current threshold function, which is repeatedly adjusted on the basis of experience. All this follows from the very simple hypothesis stated above.

To raise the level of sophistication one further notch, we can allow the threshold to be satisfied to varying degrees, in relation to how much activation it is receiving from the various properties it has learned to recognize. For such variable response, we need a THRESHOLD FUNCTION. We would like it to operate such that (1) a small amount of incoming activation (below the threshold) will result in little or no outgoing activation (2) above this threshold the level of outgoing activation rises with that of incoming activation, up to (3) a high level at which further increments of incoming activation result in very little increase in outgoing activation. Such a function can be graphed as an S-shaped (sigmoid) curve, as shown in Figure 4.

In the expanded notation we can represent various details with greater or lesser precision as the occasion demands, just as in highway maps drawn to different scales. I have already suggested a means of showing the difference between latent and established connections (Figure 2). Varying strengths of connections can be shown by varying thickness of lines; a number written inside a node indicates an *approximate* threshold, a rough indication of the midpoint of the threshold function, and so forth.

Now let us turn to the *ordered* AND of condensed notation, which for language is considerably more important than the simple unordered AND depicted in Figure 1, since linear ordering is so important a property of the

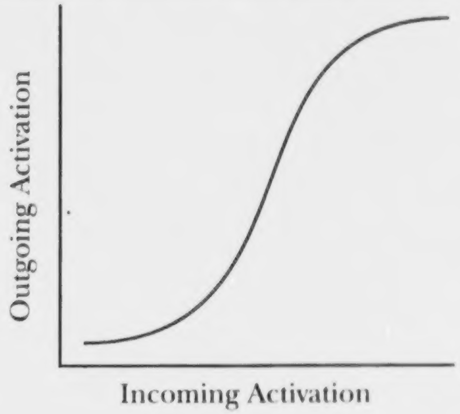

Figure 4. A threshold function

components of linguistic expression. The ordered AND is needed, for example, for *Tom cat, tabby cat, cat nap,* in which the constituents must occur in this fixed order—not the opposite order and of course not simultaneously (unordered). A simple way of drawing the ordered AND in expanded notation is shown in Figure 5, in which the little boxes with 'D' inside represent DELAY elements: The activation must be delayed a little while before proceeding. In a further expanded notation we would want to show the structure that controls the delay. The 'a' and 'b' of the figure might represent, for example, *tabby* and *cat* respectively. In production, *cat* must be delayed long enough for *tabby* to get produced; in reception, the activation for *tabby* must be delayed until that for *cat* arrives. There are several hypotheses of the internal structure of such delay elements, and it is likely that different kinds of delay structures operate at different levels of the linguistic system, for example, in syllable structure as distinguished from clause structure. But even if we knew just how the delay is controlled at a particular level, we would still find it convenient to use the notational abbreviation of Figure 5.

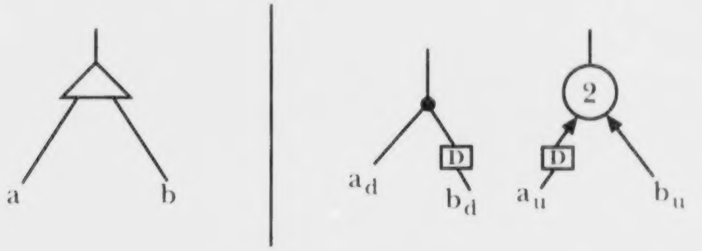

Figure 5. The downward ordered AND

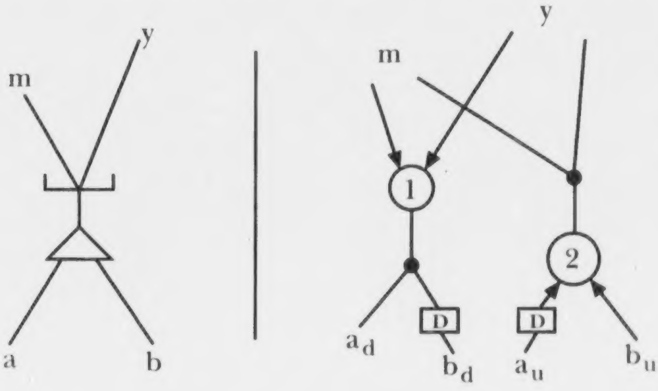

Figure 6. Expanding a condensed nection: solution 1

Now, since a line of condensed notation generally corresponds to a pair of lines of the expanded notation, and a node of condensed notation to a pair of nodes—one of them just a simple branching—in the expanded notation (figures 1 and 5), it is easy to suppose that a nection of the condensed notation corresponds to a pair of nections of the expanded notation, as shown in figure 6. And in fact this is just what I used to suppose (Lamb 1994). But there is another possibility, which turns out to be better for some purposes. Accordingly, we may label the solution represented in Figure 6 *Solution 1*. It seems to be appropriate for some cases but not for all. The line of reasoning which results in a second solution will occupy most of the remainder of this paper. Our concern here is with bidirectional processing.

Linguistic processing is of course bi-directional; it includes both production and comprehension (or understanding). That's why the relational networks have to be bidirectional. In the case of production, activation proceeds from perception and/or conceptual areas to the area which controls operation of the organs of speech-production, while in the receptive mode, activation proceeds from the auditory system to conceptual and/or perceptual (or motor) areas.

But bidirectional processing is not unique to language. At first glance this fact is not obvious, since perception is supposed to work in just one direction, from the sensory input to its interpretation, while motor activation is also unidirectional, from conceptual and planning structures to the primary motor connections which activate muscles. The linguistic system differs in having both a perceptual (afferent) side and a motor (efferent, production) side. But as is so often the case when considering such a complex object as the brain, things are not as simple as they seem at first glance.

If you are asked to visualize a cat, you can do so (if you are like most people). What is happening in this process? If that asking is in spoken form,

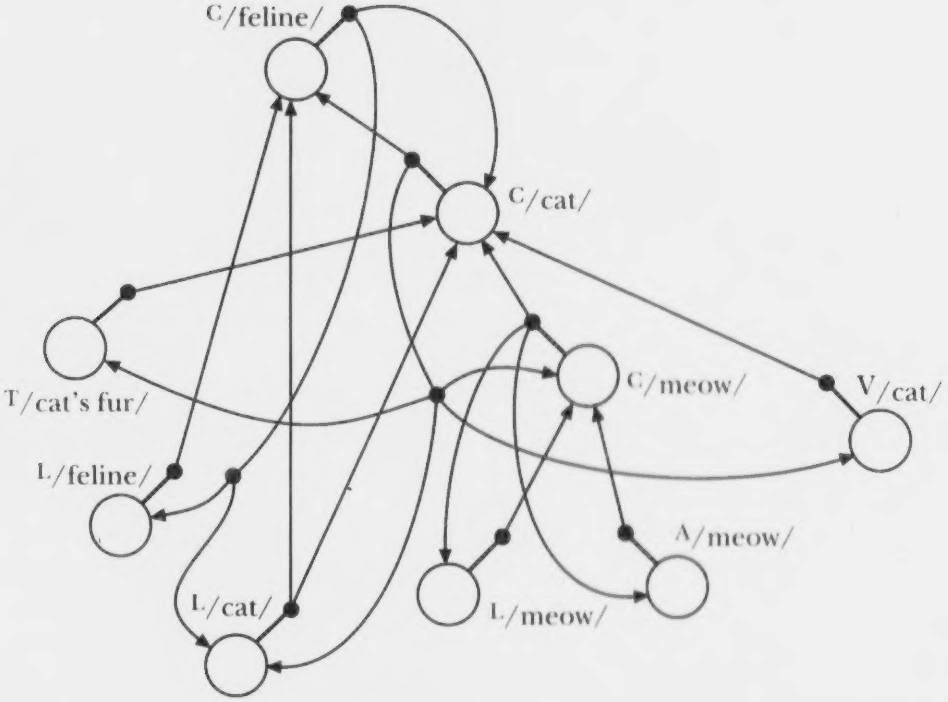

Figure 7. Micro-nection for the category CAT with some connections to other nections. Connections to higher levels of integration are shown as straight lines, those to lower levels as curved lines. The lower level nections of the diagram integrate features of still lower levels not shown. Superscript prefixes on nection labels refer to different areas as follows: ^{A} – Auditory, ^{C} – Conceptual, ^{L} – Lexical, ^{T} – Tactile, ^{V} – Visual.

your receptive linguistic network sends activation, via the area for concepts of categories of objects like CATS, to the visual system; and the visualization of a cat seems to consist of activating roughly the same high-level visual connections that would be activated as a result of seeing with the eyes an actual cat. Moreover, if you are really visualizing a cat, it isn't just such a high-level visual nection representing the category of 'cats' in the abstract, for that can't be visualized. A cat can be visualized only by visualizing various features such as its color(s), the shape of its head, its body, its eyes, the shape of its body, and so forth—in terms of the network (in which the visual system operates much like the receptive linguistic system, *mutatis mutandis*), activation has been sent from a conceptual nection to higher-level visual nections to midlevel visual nections, and even to lower-level visual nections, for it is only at the lowest level that all the visual details are represented. This is the reverse of the order of activation that occurs in the case of input from the retina, for which the lower-level nections activate certain midlevel nections, leading to higher visual levels at which the activations of the lower levels are in effect integrated by the recognition of the object which has all those features, viz. a cat. As this example illustrates, even the seemingly simplest operation in the network involves parallel activation of a large number of interconnected nections. In sum, visualizing involves having the visual system operate in the *opposite direction* from that which obtains in ordinary perception (Lamb *forthcoming*).

Similarly, we can perform auditory and somatosensory imaging. We can form auditory images of the cat's meow or the dog's bark; we can imagine what a cat's fur feels like when we stroke its back or neck. And so forth. That is, we can get our perceptual systems to operate in the reverse of what we have been accustomed to thinking of as their normal direction of operation.

Moreover, as these examples suggest, the nections activated in such a thought process can be widely distributed. If you think about a cat, you can activate visual nections, auditory nections, tactile nections representing the feeling of its fur on your fingers, the lexeme ^{L}/cat/ and the sound of its phonetic realization. What we represent in a network diagram as the nection for the concept ^{C}/cat/ (Figure 7) is thus just the central coordinating nection which can send activation to a whole family of nections, a little subnetwork of the cognitive system. What we usually think of as a concept corresponds more to that entire family, including particularly all of the details at the lowest levels, which are held together during that thought process by the higher level nections. Figure 8 shows an abstract example, and Figure 9 shows the concept ^{C}/CAT/ with hypothetical locations of some of its chief components in the left cerebral hemisphere.

On the other hand, it also seems to be reasonable to consider one of the two directions as primary. On what basis? First, activation in the primary direction probably occurs far more frequently. Second, the images we see when receiving input from the eyes are considerably more vivid than those we get when only imagining. Third, we generally perform activation in the secondary direction only after we have established the necessary connections on the basis of repeated activation in the primary direction. It is not impossible to visualize things we haven't seen, but doing so is a more creative mental activity and one which most people probably perform less readily. Nevertheless, even in ordinary perception we are evidently engaged in bidirectional processing, as all the visual details (registered in low-level visual nections) remain active in our awareness even as they are being integrated at higher perceptual levels.

Some of the cognitive subsystems relevant to this discussion are sketchily identified in Figure 10. This scheme has been arrived at on the basis of both linguistic and neurological (including aphasiological) evidence, whose

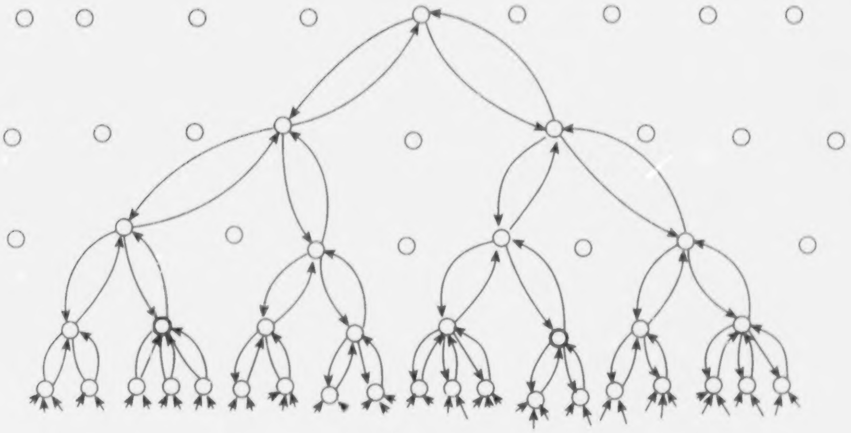

Figure 8. An activated family of nections (abstract example)

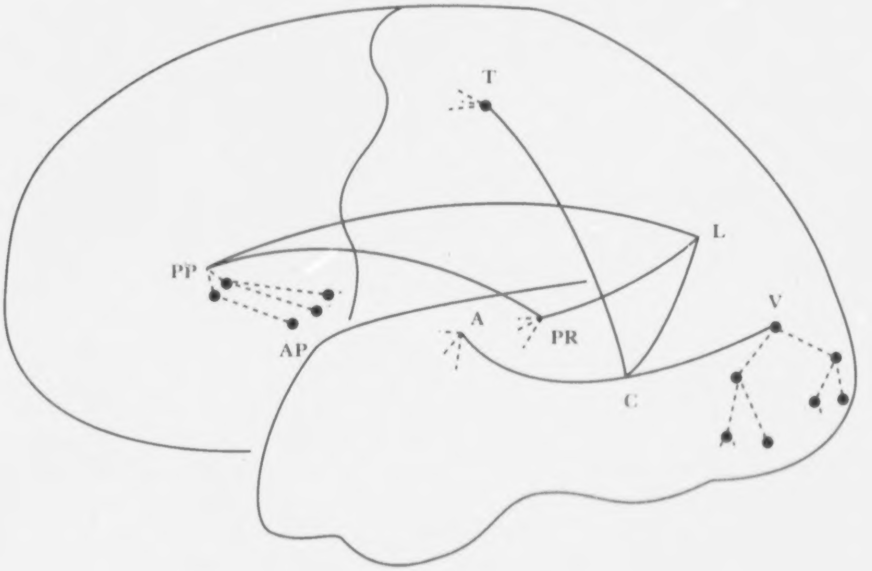

Figure 9. Major connections of the concept ^{C}/cat/, as approximate locations in the left cerebral hemisphere

- A – Auditory—recognition or auditory image of a cat's 'meow'
- AP – Articulatory Production—controls the articulation for *cat*
- C – Conceptual—the central coordinating nection for the concept
- L – Lexical—connects ^{C}/cat/ to its phonological expression
- PP – Phonological production; PR – Phonolgical recognition
- T – Tactile (what a cat feels like to the fingers and hand)
- V – visual

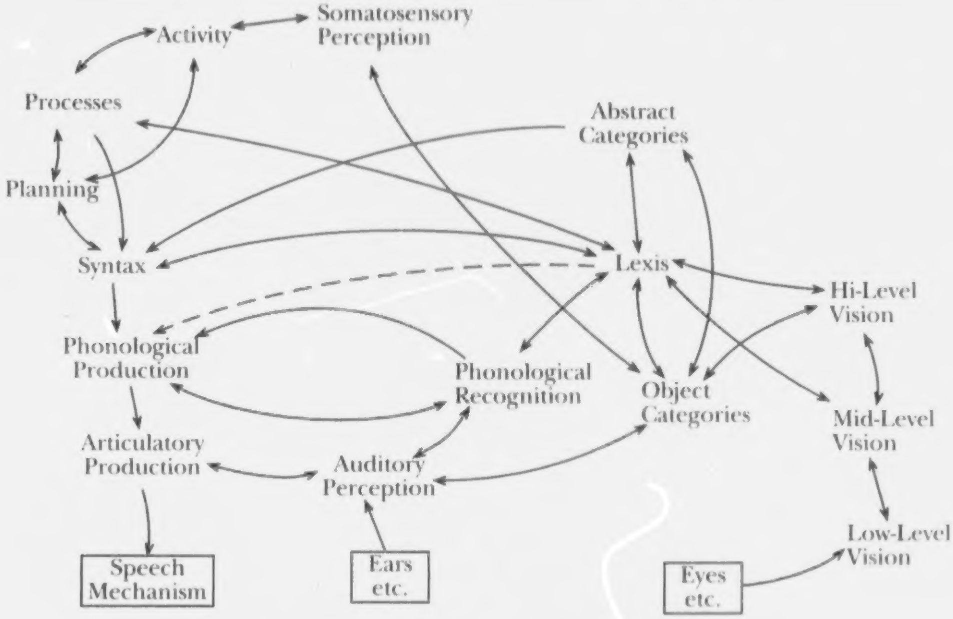
Activity
Somatosensory Perception
Processes
Planning
Abstract Categories
Syntax
Lexis
Hi-Level Vision
Phonological Production
Phonological Recognition
Object Categories
Mid-Level Vision
Articulatory Production
Auditory Perception
Low-Level Vision
Speech Mechanism
Ears etc.
Eyes etc.

Figure 10. Some linguistically important mental subsystems

presentation would take us way beyond the scope of this paper. The lines with arrows at both ends are for bidirectional connections.

As we have observed, the subsystem for producing speech is evidently separate from that for understanding speech, as indicated in Figure 10. Likewise for writing and reading (not shown in Figure 10). Also, motor activity in general is in part controlled by the (separate) somato-sensory system, so here too we actually have processing in two directions but controlled by separate systems. For such situations—that is, where the productive side and the interpretive side actually have different structures—the solution of Figure 6 seems to make sense, it being understood that the two micro-nections of expanded notation are not adjacent, as shown in the Figure, but separated (for example, one in the phonological production area, the other in the phonological recognition area) (Lamb 1994).

But I don't think we want to suppose that separate subsystems are present for each of the types of perception for which imaging is possible. These cases are indicated in Figure 10 by the lines with arrowheads on both ends. So the real question we are asking here concerns the cases where we would like activation to be able to go in opposite directions but without separate subsystems.

Figure 11 shows a simple working hypothesis for enabling the network to accomplish such bidirectional activation. It shows the outgoing lines from nections branching in opposite directions. This hypothesis of how bidirectional processing works gives us, as a bonus, an explanation of the

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phenomenon whereby we are able to identify an object—say a friend—upon seeing only a few of its visual properties—perhaps just an incomplete side view of his/her face—after which we visually fill in the details—that is, we activate additional visual features, not currently seen by the eyes—on the basis of our previous visual experiences of that individual. The same process accounts for the phenomenon of false attribution of properties, a consequence of the common thought pattern of thinking in categories. A person identifies an item as a member of a category and then mentally attributes to that item various properties which it doesn't actually have. Why? Because nections for those properties in that person's conceptual system are connected to the nection for the category, as a result of past experience. It takes only activation of a subset of the nections representing properties of the category to activate the nection for that category, whereupon the feed-backward activation goes to the whole set of nections representing properties of the category.

I now consider it important to ask this question: Is there a reasonable biological basis for this hypothesis? This question is of a type which, you will

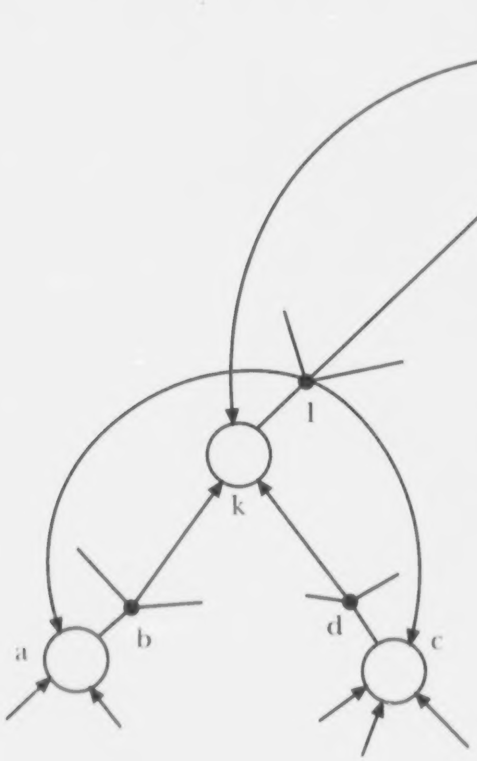


Figure 11. Feed-forward and feed-backward connections

notice, is seldom asked by those who propose linguistic models—why not, we may well wonder? But this type of question needs to be asked as linguistics becomes increasingly sophisticated and less isolated from other disciplines. For our hypothesis to be on the right track, it would be necessary that the brain have large numbers of neurons with axons branching in opposite directions. It turns out that such neurons are indeed present in the cerebral cortex—the pyramidal neurons (named for the shape of the cell body). They are in fact the most numerous of the neuron types in the cortex, amounting to around 70 percent of the total (Abeles 1991:52–53); this fact is encouraging since nections of the type we are talking about are the most numerous of the nection types in the model. (It is important to recognize that each line of figure 10 represents numerous actual connections—in some cases tens of thousands or hundreds of thousands.) Most of the pyramidal neurons have axons extending to the white matter (hence toward other cortical areas) where they typically branch in opposite directions (Abeles 1991, Burnod 1990, Feldman 1984)—as well as local connections to other neurons in their immediate vicinity.

Evidently based on such neurological findings, perhaps supported by other data he has gathered, the neurologist Antonio Damasio has already proposed a hypothesis very similar to that sketched above (Damasio 1989a, 1989b, 1989c). That we both arrived at substantially the same position independently is somewhat encouraging in that we got there from completely different starting points, he from neurology, I from linguistics.

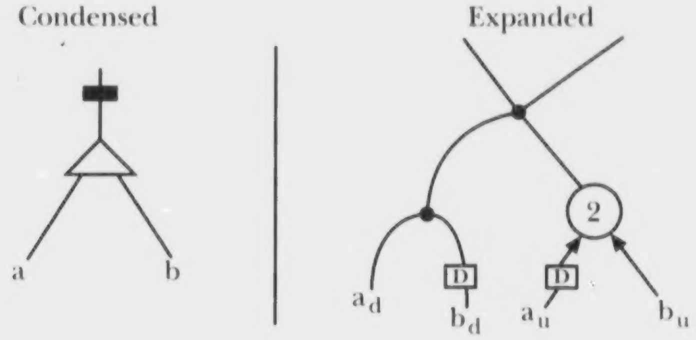
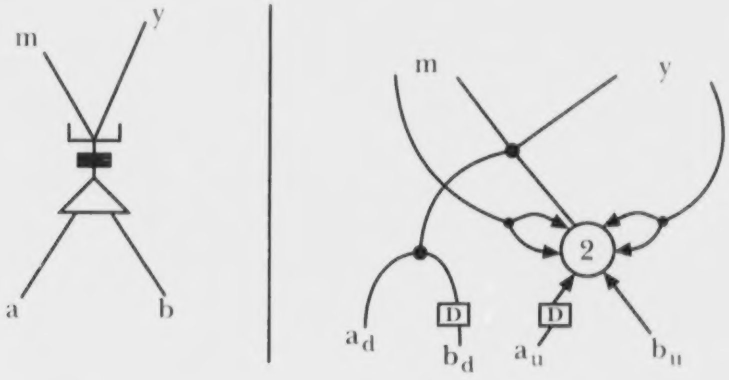


Figure 12. The ordered AND with both directions in the same nection

Now, if we adopt this hypothesis of how bidirectional processing works, we get a different way of analyzing the ordered AND of the condensed relational network notation. For, in accordance with this hypothesis, when a nection is activated from below (that is, from a lower level of abstraction/integration) it not only sends activation to higher levels *but also back to the lower level.* This property can be depicted in condensed notation by a little black rectangle as shown in Figure 12; when it receives activation it not only passes it through to the other side, it *also* sends activation back, as it were, to where it came from. This little component, which can be called a REFLECTOR, belongs at the center of the bidirectional nection of condensed notation, as shown in Figure 13. This type of nection, the bidirectional nection with an upward OR and a downward AND, should be expanded as shown in Figure 13 rather than as shown in Figure 6. In expanded notation there is the one node which receives activation *from either the lower or the upper direction* and a branching node on the output side which sends activation out in both directions if the threshold is satisfied.

And so in Figure 13 we have just one nection in expanded notation, rather than the two separate nections of Figure 6. The more simple-minded hypothesis of Figure 6 appears to be applicable for the phonological levels, where the production and recognition subsystems are separate from each other (as indicated in Figure 10), while that of Figure 13 seems to be workable for the lexical levels. Although it has gone largely unnoticed, we have seen evidence from unintentional puns that lexical nections do indeed behave in the bidirectional manner which the hypothesis of Figure 13, but not that of Figure 6, will account for (Reich 1985).



Condensed Expanded

Figure 13. Expanding a condensed nection: solution 2

CONCLUSION: Ordinary (condensed) relational notation, which has repeatedly been shown to be helpful in understanding linguistic relationships, in numerous papers by David Bennett, David Lockwood, William Sullivan, and others, is also evidently much closer to its underlying neurological reality than seems apparent at first glance.

GLOSSARY (Terms listed in alphabetical order)

- *Connections*: They have different strengths, from very weak to strong:
    - *Established*: Relatively strong; the only kind in condensed notation.
    - *Latent*: Not yet established—available to make learning possible.

- *Feed-backward link*: A line connecting to a lower level of integration.
- *Feed-forward link*: A line connecting to a higher level of integration.

- *Nection*: a module of network structure.
    - *Dedicated nection*: A nection with established incoming connections.
    - *Latent nection*: A nection with no established incoming connections.
    - *Micro-nection*: The nection of expanded network notation.
    - *Macro-nection*: The nection of condensed network notation.

- *Relational Network*. Two notational varieties:
    - *Condensed*: The now traditional bidirectional relational network.
    - *Expanded*: Shows greater detail, has one-way lines and nodes.

- *Threshold*: A nection sends activation out if its incoming activation exceeds its threshold, more if the threshold is strongly exceeded.

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LEXICAL ACCESS AND PROTOTYPES IN LANGUAGE PRODUCTION

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1. INTRODUCTION.* The nature of the 'mental lexicon' currently occupies a position of considerable prominence within psycholinguistics. Issues such as the nature of lexical storage, lexical representation, and lexical access are currently under intense investigation (e.g., Lively et al. 1994). Perhaps one of the most hotly debated areas is that of how lexical access takes place, with a variety of models (e.g., search, cohort, activation, network) having been proposed to deal with this issue. Language comprehension has received the lion's share of attention here, while experimental work dealing with lexical access in language production is relatively more recent and scarce. The major contributions in production stem from Levelt's (1989) important theoretical proposals dealing with how linguistic 'messages' are formulated, work which is further elaborated in the contributions found in Levelt (1991).

The present paper is intended as a modest contribution to the research in lexical access within language production. Two independent studies are discussed below, each focusing on a different aspect of lexical access. The first compares lexical choices made by narrators in their on-line and off-line descriptions of the same events, while the second study explores two questions associated with the use of verbs with more than one possible complement (e.g., *know* NP vs. *know that* S'). Here the issues of parallel activation and production task complexity, as well as their interactions, are explored.

It is concluded that an understanding of lexical access in language production involves crucially both prototype theory and weighted subcategorizational frames, suggesting that items are accessed in parallel rather than in a serial manner.

2. STUDY 1: PROTOTYPE ACCESS. This study compares the types of differences found in the lexical items chosen by speakers in planned versus unplanned oral narratives. Lakoff's (1989) proposals suggest that more generic forms, or

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hyperonyms, (e.g., *building, house, tree*) tend to be used by speakers when under constraints of time pressure, while more specific forms, or *hyponyms,* tend to be used when the speaker has the luxury of some planning time.

To assess this hypothesis, data were examined which had been previously collected under the aegis of an on-going research program on discourse analysis. The data were taken from an experiment in which 40 participants carried out two tasks. First, they saw a short silent movie clip (about four minutes long, taken from the Charlie Chaplin film *The Gold Rush*), for which they provided an on-line or 'play-by-play' description of what was taking place. Then, after a short break, the participants provided a second oral narrative of the same events, having had time to organize in their minds what they had seen. This was labeled the off-line or 'planned' narrative. The narratives were all taped and transcribed, and then each was analyzed syntactically and lexically. The hypothesis was that relatively more generic or hyperonym terms would be found in the on-line descriptions, while relatively more specific terms, the hyponyms, would be found in the planned descriptions.

In order to make direct comparisons with the two sets of data, it was necessary to isolate a set of lexical items from the two sets which occurred frequently enough to make systematic comparisons. After an extensive search of the data, three sets of semantic fields emerged as important. One was the field 'building', consisting of the nouns *building, house, cabin, shack, shed, hut*; the second was 'weapon', consisting of the nouns *gun, shotgun, rifle*; and the third was 'fight', consisting of the verbs *fight, struggle, wrestle, attack, grapple, lunge, pound,* and *punch.* Within each set were found both more generic forms and their more specific counterparts. Tables 1 through 3 represent the pooled data in which the more generic (general) terms are paired off against their more specific analogues in terms of relative frequencies.

Lexical Type	Examples	On-Line	Off-line
Generic	building/house	177	169
Specfic	cabin/shack/shed/hut	115	203

Table 1. Relative frequencies for the *building* semantic field

Lexical Type	Examples	On-Line	Off-line
Generic	gun	267	167
Specific	shotgun/rifle	101	121

Table 2. Relative frequencies for the *weapon* semantic field

Lexical Type	**Examples**	**On-Line**	**Off-line**
Generic	fight/struggle	70	48
Specific	wrestle/attack/grapple/ lunge/pound/punch	36	22

Table 3. Relative frequencies for the *fight* semantic field

Chi-square tests were carried out on these data. For the data within Table 1, the results ($X^2 = 15.12$, $p = .0003$) suggest a very strong effect. From inspection of Table 1, however, it is clear that the difference resides not in the generic forms and their distributions but rather in the specific forms. There is, in fact, no significant difference for the generic forms between on- and off-line frequencies. However, the more specific forms are used significantly more frequently in the planned versions than in the unplanned versions ($X^2 = 24.35$, $p < .0001$). Thus, the hypothesis for this set is only partially supported: the more specific forms are used significantly more often in planned than in unplanned narratives, while the generic forms are used equally often in both conditions.

For the *weapon* data from Table 2, the chi-square test results ($X^2 = 12.95$, $p = .0006$) again reveal a strong effect. In this instance, the original hypothesis is firmly supported, since the general term (*gun*) is found far more frequently on-line than off-line, while the more specific terms show the reverse distribution. In both individual cases, the results are statistically significant.

Finally, for the data in Table 3, dealing with the verb field *fight*, the results do not achieve statistical significance. This suggests that lexical access for the verbs may be in some major sense different from that for nouns. However, for the most frequently used terms of *fight/struggle*, these are used significantly more frequently on-line than off-line ($X^2 = 4.10$, $p = .040$). Thus, even here, the hypothesis is in part supported.

The results of this study reveal that under the time pressure of on-line production, the more generic forms (hyperonyms) from a particular semantic field tend to be used more frequently than their specific counterparts. These results have relevance to Levelt's (1989, 1991) 'hyperonym problem' in lexical access. Briefly stated, the problem is that if lexical items are organized within the mental lexicon in a hierarchic manner, such that one item's core meaning entails another's, then when the subordinate item is accessed (activated), then the entailed item is also accessed. For example, for the two lexical items *dog* and *animal*, *dog* is a hyponym (subordinate) of the hyperonym (superordinate) category *animal*. According to Levelt's proposal, whenever we access *dog*, we should also access *animal*, but it seems that this does not necessarily happen.

Levelt proposes to solve the hyperonym problem by positing three distinct principles (1989:213ff): the *uniqueness principle* (no two lexical items have the same core meaning), the *core principle* (a lexical item is retrieved only if its core condition is satisfied by the concept to be expressed), and the *principle of specificity* (only the most specific is retrieved from among those items whose core conditions are satisfied by the concept). In a real sense, then, Levelt simply defines away the hyperonym problem.

However, the results of the present study, if they can be sustained over a larger set of data, suggest that the hyperonym problem should not be defined away and that there is, in fact, evidence for the activation of a superordinate when a subordinate term is activated. Alternatively, it might be argued that in the off-line (planned) productions, more time is available for the narrator to be constructive and elaborative, an opportunity which most of our narrators took advantage of. One then wonders how the narrators would have been able to use the more specific forms (*hut, shack,* etc.) in the later, planned narratives if that information had not been present in the earlier mental model as well.

Regardless of how the hyperonym problem is dealt with, the results of this first study provide empirical support for the claim that specific lexical items from a semantic field are less likely to be used in production tasks such as on-line descriptions when there is the pressure of time, while in off-line, planned descriptions the more specific lexical items are more likely to be used.

3. STUDY 2: LEXICAL FRAMES AND PROCESSING COMPLEXITY. This study explores another aspect of lexical access and storage, that associated with the types of information activated when a lexical item is retrieved. The focus here is on those verbs which take more than one type of complement, as in

(1) a. Igor knew Rasputin well. (NP complement)
b. Igor knew (that) Rasputin left. (S' complement)
(2) a. Liz recalled/forgot Fergie. (NP complement)
b. Liz recalled/forgot (that) Fergie called. (S' complement).

It has been widely argued (e.g., Frazier 1978; Frazier & Rayner 1982; Rayner & Frazier 1987; Frazier & Clifton, 1996) that in parsing sentences with verbs with more than one complement option, parsing is serial in nature, with only one parse attempted at a time. A second parse is undertaken only if the first fails. More recently, however, evidence has begun to accumulate in support of the position that both possible frames are activated in parallel when such a verb is retrieved (e.g., Neill et al. 1988; Mitchell 1994; Prideaux 1995, 1996). According to this view, when a verb like *know* or *recall* is activated, both of its potential complement structures are made available in parallel.

However, an important question is whether both complements are equally available or whether there is a bias toward one or the other complement. For example, for *know*, is there a bias toward the NP or s' complement? A first step toward answering this question was undertaken by Trueswell et al. (1993). As part of a larger study, they had subjects carry out a written sentence completion task and gathered normative data on some 50 verbs to determine whether each was biased toward a NP or sentential complement. Their task involved presenting subjects with partial sentences consisting of a single definite article and human noun as subject, followed by a verb, such as

(3) The waiter noticed _____

and the subjects' task was to complete the sentence. They found that some verbs seemed to have a NP bias (e.g., *forget, warn, recall*) while others were biased toward a sentential complement (e.g. *hint, decide, insist*) and yet others seemed to be fairly equally biased (e.g., *notice, confess, remark*).

However, there are two problems with accepting these results as they stand. First, all the subject NPs had the same complexity, namely D+N. It is well established that, in general, sentences which are grammatically more complex make greater demands on processing than do less complex ones. So the question arises as to whether, for example, different subject NP complexity might change the biases of complements selected. For example, if the subject NP is heavy (grammatically complex), would this shift the bias toward a shorter, less complex complement than what would have been selected if the subject NP were lighter (less complex)? If so, this suggests that the allocation of resources in processing a sentence can interact with an integral part of the lexical item, the weighting assigned to its different potential complements. If not, it suggests that the inherent bias toward one or another complement type is not subject to processing considerations, at least in terms of resource allocation. In summary, the question is whether or not processing resource allocation can alter complement bias.

A second confounding issue with the Trueswell et al. results is that the sentence completion task was a written one, with no memory demands at all. If we wish to simulate natural language performance, it is crucial to devise a means to place memory demands on the subject, thereby more realistically simulating natural language use. It is to an answer of these questions that the following two sentence completion experiments were devoted.

EXPERIMENT 1. This was a written sentence completion task in which the complement choices for 14 verbs were examined. Certain of the verbs were selected from the Trueswell et al. (1993) study (*forget, warn, recall, hint, decide,* *insist*). To this list of nine were added the verbs *know* and *ask* (which can take both S' and NP complements) and three other filler verbs (*finish, write, win*).

Three different sentences were constructed for each of the 14 verbs, one with a simple D+N subject, one with a D+ADJ+N subject, and one with a D+N+Relative Clause subject. All subjects were human. Twenty-five volunteer native speakers of English completed the task. Examples of the frames are

(4) a. The teacher recalled _____.
b. The weary novelist remarked _____.
c. The carpenter who was hired to finish the porch decided _____.

The data were scored as to the type of complement used in the completion for each sentence, according to the type of subject NP. The complements included NP, S', and 'others'. The results were first analyzed in terms of the distributions of complements selected for each verb in terms of the weight of the subject NPs. Thus, for example, the verb *notice* can take either an NP or S' complement. A tabulation was made of the number of selections of each complement type for the verb with each of the three different subject structures. Table 4 shows the results for *notice*.

	Complement		
Subject Structure	**NP**	**S'**	**Other**
D+N	13	12	0
D+ADJ+N	12	13	0
D+N+RelClause	16	9	0

Table 4. Distribution of complement types for *notice*

The results, evaluated by X^2-tests, revealed that the weight of the subject NP had absolutely no effect on the type of complement chosen for any of the 14 verbs. In the case of *notice*, for example, the choice of a subject NP structure has no bearing on the distribution of the complements ($X^2(5)=2.05$, $p=0.845$) Accordingly, the results for each of the three frames for each verb were pooled for further analysis. The results were then scored in terms of the frequency that each complement type was selected in the completions. The differences in bias for each verb were assessed by X^2 tests. The results can be found in Table 5.

These results reveal some discrepancies between our study and that of Trueswell et al. in the actual biases of three verbs (*forget, warn, recall*), discrepancies resulting from the scoring techniques used. In our study, we treated infinitive complements as S', whereas for Trueswell et al., sentential

Verb	Complement Type NP	S'	Other	x^2	Bias
forget	18	53	4	17.3 ****	s'
warn	23	46	6	7.7 **	s'
recall	42	32	1	1.4 ns	split
hint	1	54	20	51.1 ****	s'
decide	0	63	12	63.0 ****	s'
insist	1	67	7	64.1 ****	s'
notice	41	34	0	0.6 ns	split
confess	8	53	14	33.2 ***	s'
remark	2	53	20	47.3 ***	s'
know	19	55	1	17.5 ***	s'
ask	7	52	16	34.3 ****	s'
finish	40	34	1	0.5 ns	split
write	47	12	16	20.8 ***	NP
win	71	0	4	71.0 ****	NP

** $p < 0.01$, *** $p < 0.005$, **** $p < 0.001$

Table 5. Sentence completion experiment 1: Complement biases

complements were only those clauses containing a tensed verb (i.e., *that* clauses). Were we to have used that scoring device, which in our view is flawed, we would have obtained the same results as the previous study.

Our results suggest that there is no effect associated with the grammatical complexity of the subject NP, although there is a distinct bias for one or another complement type for most of the verbs examined. Only three in our set of 14 appear to have relatively balanced biases (*recall, notice, finish*).

However, this study makes no demands at all on memory, since the stimuli were written. The question still to be addressed is whether the relative complexity of the subject NP might affect the type of complement chosen when a task with greater memory demands is used. It is to that issue that the second experiment is addressed.

EXPERIMENT 2. In this study, a sentence completion task was also used. In this case, however, the stimulus materials, the incomplete first parts of sentences up to and including the target verb, were presented on a computer screen

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using PowerPoint. Each word was presented individually for one second. The subject was asked to read each word aloud as it was presented. Then, at a point after the verb, a dash appeared on the screen, and the subject was to complete the sentence orally. In this study, two types of subject NPs were used, one with a simple D+ADJ+N (the 'light subject' condition) and the other with the structure of D+ADJ+N+Relative Clause (the 'heavy subject' condition).

The purpose of this study, like the one discussed above, was to determine whether an increase in complexity of the subject NP would push the selection of a complement in the direction of less complexity. Therefore, the target stimuli in this study were selected to be primarily either s' or split bias verbs, with the hypothesis that the more complex the subject NP, the less complex the complement would be. The verbs selected were *know, mention, predict, forget* (all of which can take either s' or NP complements, and all biased toward S'). The verbs *win, strike, decide on,* and *hint* were used as fillers. For the eight verbs, there were two conditions (light subject and heavy subject), yielding a total of 16 stimulus sentences.

		Complement			
Target Verb	**Condition**	**NP**	**s'**	**Other**	**Bias**
know	light	9	33	0	s'
	heavy	7	34	1	s'
mention	light	5	27	10	s'
	heavy	3	35	4	s'
predict	light	8	36	0	s'
	heavy	4	38	0	s'
forget	light	7	35	0	s'
	heavy	6	36	0	s'

Table 6. Oral sentence completion task

Some 42 native speakers of English served as subjects, each of whom was tested separately. Once the task had been explained to the subjects and their questions had been answered, a practice session was run. After any further questions, the experiment was conducted. The entire session took only about 20 minutes. The results are found in Table 6.

As is clear from Table 5, the weight of the subject NP has no bearing on the selection of complement type for our four target verbs. Even under the condition in which memory is taxed, the bias for the verbs remains constant. Moreover, these are the same biases as found by Trueswell et al.

We can therefore conclude that there is no direct processing effect on the inherent biases of complements associated with these verbs. They appear to be relatively stable under the two different tasks employed here.

4. CONCLUSIONS. In this paper I have attempted to address two quite distinct, but related, issues dealing with the mental lexicon. The first dealt with the sorts of associations which are activated within a semantic field when a lexical item is produced. Under the pressure of on-line, rapid language production, we found that there is a tendency for narrators to use more prototypic members of a semantic field. Off-line, however, when there is no time pressure and also an opportunity for the narrator to engage in some degree of planning, there is a stronger tendency to use more specific forms. This result suggests the prototype members of semantic fields play important roles in language production, both on- and off-line.

In the second study, we examined one important type of information which is activated when verbs are accessed, that of the kinds of complements they may take. With a focus on those verbs which can take both sentential and NP complements, we found evidence that certain such verbs have an inherent bias toward one or another of their complements. Here we asked whether, when processing resources (such as memory allocation) are varied, this would alter the selection of complements. Our results revealed no differences in complement selection. We can therefore conclude that the complement information stored with a verb, along with the weightings associated with each complement, is not at all affected by processing considerations.

In summary, the present work provides additional support for the view that an understanding of the mental lexicon, and in particular the issues of lexical access and storage, must encompass prototype theory, parallel processing, and the stability of differential weightings for verbal complements in lexical representations.

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III. HISTORICAL-COMPARATIVE LINGUISTICS

BASQUE AND THE OTHER DENE-CAUCASIC LANGUAGES

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The Basque language has long fascinated linguists. Widely regarded as a language isolate, with no demonstrable relationship to any other language, a minority of historical linguists has proposed various external relations for this language, most commonly, with Afroasiatic (especially Berber), with Kartvelian, or with (North) Caucasic.[1] (See, e.g., Bengtson 1990, 1994a; Blažek 1995; Trask 1994–95, 1995, for surveys of such proposals.)

My own investigation of these questions has led to the conclusion that Basque is most closely related to Caucasic languages and Burushaski, forming a family that I have called Macro-Caucasic (=Vasco-Caucasic). The evidence further shows that Macro-Caucasic, in turn, is a branch or subfamily of the older Dene-Caucasic (or Sino-Caucasic) macro-phylum, as proposed by Sergei Starostin and Sergei Nikolayev (Caucasic + Sino-Tibetan + Yeniseian + Na-Dene: see Shevoroshkin 1991, 1992). This paper will focus on the larger picture, and some of the evidence linking Basque to other Dene-Caucasic languages will be presented. The evidence consists of three parts: *lexical, morphological*, and *phonological*.

Lexical evidence: Archaic residue: The following comparisons are arranged alphabetically, according to the English gloss of the Basque word. Basque is presented first, then in roughly west-to-east order, Caucasic, Burushaski, Sino-Tibetan, Yeniseian, and finally Na-Dene.

blood: Basque *odol* (**o-dol*) 'blood'; Burushaski *del* 'oil; contents of an egg'; Na-Dene: Eyak *del* 'blood'; Carrier *del*, Galice *dal*, Navajo *dił* 'blood'.

§ The Burushaski word is problematic, since it coincides with a common Indo-Aryan word *tel* (*taila-*) 'oil'. However, the meaning 'contents of an egg' is foreign to Indic, so possibly Burushaski already had the word *del* 'contents of an egg', which later merged with *tel* 'oil'.

bone: Basque **-sur* 'bone': *ezur* (AN, BN, G, L), *ẽzur* (R), *hezur* (BN, L), *hezür* (S), *azur* (B); Caucasic: PEC **r̄imswe* (~ **mswīre*?) 'side, rib':

Lak *niws* 'rib'; Lezgi *zur* 'side', Agul *sur* 'half' (NCED 954); Sino-Tibetan: PTB **rus* 'bone': Tibetan *rus-pa,* Kachin *n-rut,* Lushei *ruʔ.*

§ This comparison assumes metathesis (type SUR ~ RUS), which is quite common in Dene-Caucasic (cf. SNOW, below).

LITTLE: Basque *guti* (AN, BN, L), *güti* (S) 'few, little, little bit'; Caucasic: PNC **k̠Hə̄t'wV̄ / *k̠wHə̄t'V̄* 'short'; Lak *kut'a-* 'short', Lezgi *güt'ü* 'narrow', Budukh *goda* 'short', Abaza *gdi* 'hornless' (NCED 690–91); Burushaski *khuṭ* 'short'; Na-Dene: Eyak *gut'* 'very small, tiny' (LDC §195).

MOUTH: Basque **a-x$^{(w)}$'o* 'mouth': *aho* (BN, L, S), *ago* (AN, B, G, R), *abo* (B), *ao* (AN, B, G, R); Sino-Tibetan: PST **KhōH* 'mouth'; Old Chinese **khōʔ*, Garo, Dimasa *khu*; Yeniseian: PYen **Xowe* 'mouth': Ket *qō*, Kott *hōpi* (SSEJ 302f); Na-Dene **Xu•ʔ* 'tooth': Tlingit *ʔuX*; Eyak *-Xu•-ł*; Chipewyan *xù-, -γù, -γú,* Navajo *-γó•*, etc. (LDC §5).

§ Phonetically and semantically straight forward. The only semantic deviation is Na-Dene, which has 'tooth', a not uncommon metonymy.

NAME: Basque **-sen* 'name': *izen* (C), *uzen* (B); Burushaski *sén-, sí-* 'to say, to name', *sen-as* 'named'; Na-Dene: Tlingit *sà* 'name, voice', *-sà, -sá, -sen* 'to name, to breathe'.

§ Phonetically and semantically clear. Note incomplete pardigmatic denasalization in Burushaski and Tlingit. Tlingit 'to name, to breathe' is probably the phonetic merger of formerly distinct roots.

NAVEL: Basque *zil* (B) 'navel, umbilical cord', *txilko* [čvilko] (AN, G) 'navel', *xilko* [šilko] (AN, BN, L) id; Caucasic: Dargwa *č'ilič'a* 'navel', Tabasaran *c'ul;* Yeniseian **tɨl ~ *tɨr* 'navel': Ket *tīl',* Yug *tɨl* (SSEJ 286); Na-Dene: Eyak *-ǰiʔt'g* 'navel'.

§ Apparently a very old word, the simplex form retained in Bizkaian Basque (*zil*) and perhaps Tabasaran and/or Yeniseian (see Starostin's note in SSEJ 286). The other languages reflect a diminutive of the type**ǰil(V)-k'V* 'little navel'.

SNOW: Basque **e-łu-r* 'snow': *élhür* (S), *elur* (AN, G), *erur* (B), *edur* (B); Caucasic: PEC **łĭwV / *ǰĭwłV* 'snow': Chechen *lō,* Batsbi *law,* Lezgi *žiw,* Tabasaran *jif* (NCED 684); Sino-Tibetan: ? Tibetan *li-s* 'snow', Waya *li-ri;* Na-Dene: Eyak *łaʔ* 'glacier'; Kato *lō* 'frost', Chipewyan *-lù* 'hard, frozen solid', Navajo *n-lō* 'hail' (LDC §101).

§ Phonetically and semantically clear. Basque *-r* is probably an old plural element (for 'snowflakes'?).

SWEAT: Basque *izerdi* (C), *izardi* (B) 'sweat', also (AN, BN, R) 'sap' (juice of plants); Caucasic: PEC **ć'ād'wV* 'blood, life': Chechen *c'ij* 'blood', Hurrian *zurgi* (*zur-gi*) 'blood', Avar *č-ágo-b* 'alive', etc. (NCED 376); Yeniseian **sur* 'red, blood': Ket *sūl'-am* 'red', *sul'* 'blood', etc. (SSEJ 278).

§ Words for bodily secretions (blood, sweat, tears, pus, saliva) are all historically connected. (Cf., e.g., Old English *swǣtan* 'to sweat', also 'to bleed', sim. in other older Germanic languages.) For phonology, cf. below, PHONOLOGY section.

TEARS: Basque **niGa / *neGa* 'tears, weeping': *nigar* (BN, L, S), *negar* (AN, B, G, L); cf. *negal* 'herpes, skin eruption'; Caucasic: PEC **nĕwq'ŭ / *nĭwq'V̆* 'tears; pus': Chechen *not'q'a* 'pus', Andi *moGo* 'tear', Bezhta *maq'o / miq'a-*, Dargwa *nerŷʷ*, Archi *nabq* 'tear' (NCED 848f); Burushaski (Hunza) *nagé*, (Yasin) *magé* 'boil' (pus eruption); Sino-Tibetan **nōk / *noŋ* 'pus': Old Chinese **nūŋ*, Tibetan r-*nag*, s-*nag* 'pus'; Yeniseian **dɔk-ŋ* 'pus': Ket *dɔˀŋ*, Kott *takŋ* (SSEJ 223f; PYen **d-* from PDC **n-*); Na-Dene: ? Navajo *néˀé-tòˀ* 'tears' (only if *néˀé-* is not simply a form of *-na•ˀ* 'eye').

§ A highly basic comparison. See note to SWEAT.

THREAD: Basque **xal,i* 'thread': *hari*, *hal-* (BN, L, S), *ari*, *al-* (B, G, AN); *(h)al-* is the form used in compound words; Caucasic: PEC **X̱āḻV* 'sinew, thread': Chechen *Xal* 'a piece of thread', Bezhta *Xila* 'sinew', Lak *X̄al* 'thread, wire' (NCED 1067–68); Na-Dene: Eyak *Xehł* 'rope, cord, twine, string; to tie' (LDC §161).

§ A cultural etymology of the most basic (paleolithic) type.

WATER: Basque **Hur* 'water': *hur* (S), *ur* (C); Caucasic: PEC **ħwirƚ* 'lake, pond': Avar *ħor*, Andi *ihur*, Lezgi *wir*, Agul *ˤür* (NCED 506); Burushaski *hur* 'water conduit (for milling and irrigation)'; Yeniseian **xur,* 'water': Ket *ūl'*, Yug *ur* (SSEJ 298) and/or **xur* 'rain': Ket *ul'-es'*, Yug *ur-es*, etc. (SSEJ 297), and/or **xura* 'damp, moist' (SSEJ 298).

§ A very basic etymology.

WHAT? Basque **se-* (interrogative): *ze-r* 'what?', *ze-in* 'which?'; Caucasic: PNC **sǟj* 'what?' (interrogative pronoun): Ingush *se* 'what?', Lak *sā-* 'what?' (oblique base), Ubykh *sa* 'what?', etc. (NCED 958);

Burushaski *-sa, -se* (in *bésa, bése* 'why?); Sino-Tibetan: PST *su 'who?': Tibetan, Kanauri, Vayu *su,* Burmese *a-su* 'who?'; Lepcha *să-* (in *să-re* 'which, what?', *să-ba* 'where?', etc.; Yeniseian *ʔas- / *sV- (interrogative): Yug *ases* 'which?', *assa* 'what?', etc. (SSEJ 184); Na-Dene: Haida *us* (yes-or-no question marker), Tlingit *sa* (interrogative particle), *dàà-sa* 'what', etc. (Sino-Dene 215-16).

§ A clear Dene-Caucasic etymology, very basic and preserved almost everywhere.

These twelve comparisons are a fraction of the total Dene-Caucasic comparisons involving Basque. (See, e.g., Blažek & Bengtson 1995, with 126.) Except for THREAD, which is cultural vocabulary (but compatible with a very early stage), all the words are highly basic. Furthermore, all phonetic changes are plausible (and, as will be shown below, regular and recurrent), and all the semantic equations are either exact (mouth = mouth, navel = navel) or at least typologically plausible (bone = rib, snow = frost, water = lake). Would it not be highly suspicious if all the semantic equations were of the first (exact) type, since the long time span assumed for Dene-Caucasic would seem to assure many of the second (shifted) type?

The MOUTH comparison illustrates the importance of Basque as a witness to the western range of Dene-Caucasic. Dene-Caucasic *X$^{(w)}$owHV (or *q^{w}HowV?) 'mouth' was apparently lost (or at least rendered semantically and/or phonetically unrecognizable) in Caucasic and Burushic, but remains in Basque.

R. L. Trask (1995:78), in his critique of my work with Basque, claims that all of these comparisons are merely 'random resemblances'. But in fact random resemblances do not show evidence of underlying morphology (see the next section, MORPHOLOGY); nor are they replete with recurrent and regular sound correspondences (see the third section, PHONOLOGY); nor do they consistently fall within the same set of languages. These basic parallels require an explanation.

MORPHOLOGY: Fossilized grammar: The idea of fossilized (petrified, lexicalized) grammatical elements, which have lost their original function but remain as phonetic components, is well known in historical linguistics. (See, e.g., Greenberg 1978; Schulze-Fijrhoff 1992.) I have proposed (Bengtson 1991c, 1991e, 1994a, 1995b) that some elements in Basque appear to be of this nature, namely some apparent noun prefixes, e.g. (in alphabetical order):

Bsq	*a-ho*, 'mouth',	*a-dar* 'horn',	*a-tso* 'old woman'
	ar-han 'plum',	*ar-dano 'wine',	*ar-ska* 'trough'
	be-larri 'ear',	*be-hatz* 'thumb',	*be-hazun* 'bile'
	bi-zka-r 'back',	*bi-hotz* 'heart',	*bi-zi* 'life'
	e-lur 'snow',	*e-uri* 'rain',	*e-sne* 'milk'
	i-zerdi 'sweat',	*i-zar* 'star',	*i-zen* 'name'
	o-dol 'blood',	*o-kotz* 'snout'	
	u-kondo 'elbow',	*u-zki* 'anus',	*u-rdail* 'stomach'

In each case, the segment of the noun following the prefix has been identified with a provisional cognate (or cognates) in other Dene-Caucasic languages, e.g., *a-ho* 'mouth' (from *a-x$^{(w)}$o), where the second element is compared with Yeniseian *Xowe, etc. (see MOUTH, above). Because of the vocalic symmetry of the *b* prefixes, low *be-* opposed to high *bi-*, I have suggested that some of the other prefixes alternate in a similar way and thus were originally variants of the same prefix, i.e.:

type (a)	*o- / u-*	
type (b)	*e- / i-*	
type (c)	*be- / bi-*	
type (d)	*ar-*	(invariant)
type (e)	*a-*	(invariant)

Now it is one thing to propose the existence of these patterns of phonetic segments, but quite another to show that there is (or was) any morphological function to those segments.

For a starting point, it would seem natural to test the possibility that these prefixes once were *class* (or *gender*) markers, typologically similar to those found in Caucasic languages, as well as in Bantu and other Niger-Kordofanian languages, and others. If so, are there any indications that the phonetic patterns of the Basque prefixes coincide with semantic patterns? In fact, *all* the words with the *be-/bi-* (type c) prefix have to do with body parts or things closely associated with the body, thus 'ear, thumb, bile, back, heart, life', above. The words with the *e-/i-* (type b) prefix are mass nouns ('snow, rain, milk, sweat') or members of a collective ('star, name'). Words with the *o-/u-* (type a) prefix are again body parts or fluids ('blood, snout, elbow, anus, stomach'). Words with the *a-* (type e) prefix can be body parts ('mouth, horn') or living beings ('old woman'). Words with *ar-* (type d) prefix have to do with objects of human industry ('plum, wine, trough'). So in my opinion, these are not mere phonetic patterns, but are also correlated with semantic categories.

The next step is external comparison. Since the investigation of vocabulary led to the conclusion that Basque is genetically closest to Caucasic and

Burushaski, it seemed logical to compare the Basque prefix pattern with morphological structures in the Caucasic languages, especially those reconstructed for earlier stages. As it happens, several Caucasic languages do have noun classification with three or more classes, and East Caucasic (according to Diakonoff *&* Starostin 1986:10, 71) had four classes, marked (in the singular) **ṷ-* and **j-*, **w-* and **r-* respectively. Comparing these with some of the Basque prefixes, we find a good correlation:

Basque	*o-/u-*	Caucasic	I	*ṷ-*
	e-/i-		II	*j-*
	be-/bi-		III	*w-*
	ar-		IV	*r-*

All the data indicate the probability of a long-since obsolete classification system in the earliest Basque, one that furthermore has material correspondences with the Caucasic classification system. Farther afield in Dene-Caucasic, note the frequent fossilized prefixes in some Sino-Tibetan languages (e.g., Tibetan *m-čhin* 'liver', *r-nil* 'gums', *d-bu* 'head', etc.).

In his critique of this hypothesis, Trask (1995:73–74) makes several objections, which I will respond to here. (See also my earlier response: Bengtson 1995b:93.) Trask points out that there are many words beginning with *b-* in Basque; therefore my hypothesis that only *some* of them contain the prefix *b-* (actually, *be-/bi-*) is not supported. It is easy to see why this is not true. For example, many words in German begin with *b-*, but only some of them, and it is quite clear which ones, contain the prefix *be-* (e.g., *Besitz*, but not *Besen*). (Lest there be any misunderstanding, I am not claiming any connection between Basque *be-/bi-* and German *be-*! It is given only as a typological example.)

Similarly in Basque, the prefix *be-/bi-* is postulated only when the following segment can be isolated and has a clear Dene-Caucasic cognate, for example Basque *be-larri* 'ear', compared with Caucasic **ḻĕHḻi* 'ear', Proto-Nakh **la*, **lari* 'ear'. So the 'removal' of *be-/bi-* is not at all 'arbitrary' as Trask alleges.

Trask goes on to list many other words beginning with *e-*, *i-*, *o-*, etc., which do not have a place in my class-prefix hypothesis. Two reasons for this are: (a) in some of these words, external comparison shows that the initial vowel is more likely a root vowel than a prefix (e.g., Basque *(h)ertze* 'intestines', compared with Avar *ˤórčo* 'intestine, sausage' by René Lafon [1952:87]), and (b) many other Basque words have not yet been etymologized in a Dene-Caucasic context, so we do not know whether a prefix is present or not. This is a hypothesis in its infancy, so quite naturally we cannot yet answer every question about this phenomenon.

Another objection by Trask is that words for body parts can have any of several prefixes. This objection is groundless, since in fact it is typical of Caucasic languages with class systems that anatomical words can belong to more than one class. A familiar European example is found in German, which has *Auge* 'eye' (neuter), *Nase* 'nose' (feminine), and *Mund* 'mouth' (masculine).

Finally, Trask (1995:78) protests that 'prefixes are virtually unknown in Basque'. True, but we are not concerned here with present-day Basque, but a far earlier stage. One could just as well assert that *ru-* in Lezgi *rufun* 'belly' (NCED 771) cannot be a prefix, because Lezgi has no (living) classification system. But comparison with other Lezgian languages has shown that the system once was living in Lezgi at an earlier stage, and fossilized relics like *ru-* (from Caucasic **r-*) remain sporadically in some Lezgi words in much the same way as I am proposing for Basque. So none of Trask's objections stands up to scrutiny.

Trask's tendency to emphasize *only* the negative arguments, and ignore all positive points, shows that he is not interested in the pursuit of the truth, but only in shouting down a hypothesis that conflicts with his own predetermined views.

PHONOLOGY: Trivial and nontrivial correspondences: Václav Blažek and I have proposed a number of regular phonetic correspondences between Basque and other languages, both in the narrower Macro-Caucasic sense (Bengtson 1992) and in the broader Dene-Caucasic picture (Blažek & Bengtson 1995). In his critique Trask (1995:75ff) tries to muddy the water by selecting the most problematic area (sibilants and sibilant affricates), and tabulating the data from *all* my comparisons involving these sounds. Trask furthermore arbitrarily distinguishes Caucasic *s-* from *sw-*, *c'-* from *c'w-*, and so on (an assumption that is not made in my model), creating the illusion that the correspondences are irregular. What is overlooked is the fact that Basque *z-* corresponds with Caucasic *s(v)-* in four of the examples, and with Caucasic *c'(v)-* in six, which is a nucleus of regularity, and can be confirmed by further examples.

At most, Trask has shown that some of the proposed correspondences are not yet totally worked out (a process that has taken many decades, and still is not complete, in Indo-European studies), but this is far from showing that *all* of them are invalid. Trask glosses over the many examples that are clear and straightforward, for example, the 'trivial' correspondence Basque *b* = Caucasic *b* = Burushaski *b*:

1. Bsq *bigar*~*bihar* 'tomorrow' = PEC **bəgə* 'morning, evening': Khinalug *ṗaga* 'tomorrow', etc. (NCED 292);
2. Bsq *bost*~*bortz* 'five'; *boste-ko* 'hand' = PEC **b[ə]çV* 'paw, part of arm or leg': Tsez *besi* 'fist', etc. (NCED 291) = Bur *bacin* 'thigh';

3. Bsq *belar* 'forehead' = PEC **bˁāl̲hŏ* 'edge, end': Rutul *bäl* 'forehead', etc. (NCED 285);
4. Bsq *bek(h)o* 'face, beak' = PEC **bĕk'wo* 'part of face, mouth': Tsakhur *bok'* 'muzzle', etc. (NCED 289) = Bur *buk~bok* 'throat, gullet, neck';
5. Bsq *bethe* 'full' = PNC **bVtV̄* 'hard, tough': Chechen *butū* (NCED 320) = Bur *buṭ* 'much, many, very';
6. PEC **būrV* 'gray, brown': Agul *bure-r* 'gray', etc. (NCED 313) = Bur *bur-úm* 'white';
7. Bsq *buru* 'head' = Bur *bur* '(a single) hair';
8. Bsq *ibar* 'valley' = Bur *bar* 'nullah, ravine, valley;
9. Bsq *bil-* 'to collect, gather' = Bur *bil, bir-bir* 'full'.

As abundant as these examples are, I think the more interesting, and more probative, cases are the *nontrivial* correspondences of the Dene-Caucasic *lateral affricates* ('tˡ' sounds), which turn out to have positional variants in Basque (and Burushaski). For the sake of brevity, the following lists focus on Basque and Caucasic evidence:

(a) Initial *Tˡ- becomes Basque *l-*:

1. Bsq *lozer~liztor*, etc. 'hornet' = PEC **tˡămç'V* 'biting insect' (Andi *łanč'i* 'ant', etc. NCED 766)
2. Bsq *limuri* 'humid', etc. = PEC **tˡHwemV* 'liquid' (Andi *łemi*, etc. NCED 768)
3. Bsq *labar* (**laba-r*) 'edge of a precipice' (Durango), 'coastal land' (Arratia, Markina) = PEC **tˡ'ānpV* 'lip' (Tsez *tˡ'epu*, etc. NCED 774)
4. Bsq *lapa(i)tz* 'burdock' = PNC **tl'ăpi* 'leaf' (Chamalal [dial.] *lapā* 'leaf', etc. NCED 774)
5. Bsq *lahar* 'bramble, creeping plant' = PNC **tˡ'wĭrˀV* 'leaf' (Karata *tl'ale*, etc. NCED 784)
6. Bsq *lape* (S) 'shelter under the eaves of a shed' = PEC **tˡ'ĕpV* 'stone plate or shed' (Chechen *laba* 'shed; peak of cap', etc. NCED 777)
7. Bsq *lasto* 'straw (of various grains)' = PEC **tˡ'ačă* 'leaf; a kind of plant' (Budukh *q'əč'* 'straw', etc. NCED 773)
8. Bsq *laz* (L) 'beam, rafter' = PEC **t̲ˡ'VćV* 'log, pole' (Akhvakh *tˡ'eč'a* 'log', etc. NCED 781)
9. Bsq *lerro* 'file, string, row' = PEC **t̲ˡ'wăr(h)ə̆* 'boundary' (Avar *t̄ˡ'er* 'garden bed, terrace, row, rank', etc. NCED 782)
10. Bsq *larri* 'sadness, anguish', etc. = PNC **d̲ˡwĕrV* 'hard, severe, stern' (Avar *tˡʷára-ra-b*, etc. NCED 792; cf. Tibetan *ldar-ba* 'to be weary, tired, faint, languid')

(b) Medial *-Tˡ- becomes Basque *-rd-*:

1. Bsq *erdu* (B) 'come!, come ye! = PNC **ē̱rtˡŭ* 'to go, walk, enter' (Lak *ulu* 'let's go!', etc. NCED 422)
2. Bsq *erdoil* (**e-rdol₂i*) 'rust (of plants)' = PEC **ṯˡwĕḻʔĕ* 'mould' (Rutul xul, etc. NCED 770)
3. Bsq *erdi* 'middle, half' = PNC **=ĕṯˡ, Ĕ* 'middle, half' (Tindi *b-alˡ'i*, etc. NCED 412; cf. also Tibetan *lte* 'navel, center')
4. Bsq *urde* 'pig' = PNC **wHărṯˡ'wə* 'boar, pig' (Tsez *betˡo*, etc. NCED 1047)
5. Bsq *hardo* (L), *arda-* (C) 'tinder (made from a kind of dried fungus)' = PEC **ʔwētˡ'V* 'a kind of grass' (Chechen *jol* 'hay', etc. NCED 230)
6. Bsq (AN) *barda* 'belly, paunch' = PEC **bhĕrṯˡ'V* '(large) intestine' (Bezhta *batˡa*, etc. NCED 297)
7. Bsq *(h)erde* (AN, BN, L) 'drivel' = PNC **ħămtˡă* 'sweat' (Karata *hantˡ'a*, etc. NCED 509)
8. Bsq *urdail* 'stomach, abomasum, rennet' = PEC **=ĭraḏˡV* 'stomach, rennet, abomasum' (Karata *m-elˡ'u* 'stomach', etc. NCED 670) = Burul 'stomach'
9. Bsq *izerdi*~*izardi* 'sweat, sap' = PEC **ć'ādˡwV* 'blood, life' (Chechen *c'ij* 'blood', etc. NCED 376)
10. Bsq *erdara*, *erdal-* 'foreign' = PEC **ḏˡōlV* 'guest, neighbor' (Khwarshi *tˡar* 'guest', etc. NCED 790)

So there are *ten* comparisons verifying the correspondence of Basque initial *l-* to Caucasic initial *tˡ-*, *dˡ-*, and *ten* showing the correspondence of Basque medial *-rd-* to Proto-Caucasic medial *-tˡ-*, *-dˡ-*. From this evidence I conclude that the Bsq cluster *-rd-* (phonetically [rð]) as a reflex of Dene-Caucasic Tˡ appears only in medial position, and in initial position the old lateral affricates merge with ordinary *l*.

In addition this evidence proves that the etymologies connecting Basque with Dene-Caucasic cannot be mere 'random resemblances', as Trask phrases it, because *random resemblances do not behave in this patterned way.* Instead, this evidence should be recognized for what it is: corroboration of a genetic linguistic connection, obtained through the use of the classical comparative method.

CONCLUSIONS: Trask claims that those of us who propose the relationship of Basque to Caucasic, Burushaski (and others) merely collect examples that support our 'pre-determined' conclusion and ignore all other evidence. This statement has no basis in fact. First of all, where did our supposed 'predetermined conclusion' come from? And who 'pre-determined' that we would find this kind of positional variation in Basque: initial *l-*, but medial *-rd-*? In reality, these are the same kinds of nontrivial correspondence that have traditionally served as the verification of genetic relationship. Why should it be any different with Basque and Dene-Caucasic?

The only reason there is a difference is that the Basque language has attracted a coterie of specialists, some of whom (notably Trask) have built up a body of lore about the prehistoric stages of Basque ('Pre-Basque') based entirely on internal evidence and a dose of speculation. (See '"Pre-Basque Phonology": A Hypothesis Built on Sand', Bengtson 1995b:90–91.) Because these vasconists accept no external relations for Basque, their hypotheses cannot be checked by external comparison. Yet when some of us propose external comparisons, these same vasconists reject them because they conflict (or seem to conflict) with their models of Pre-Basque. This is a circularity that could be broken by the application of a scientific attitude on the part of all concerned and a willingness to suspend preconceptions and reexamine one's hypotheses objectively in the light of the Dene-Caucasic evidence.

The Dene-Caucasicists (Starostin, Nikolaev, Chirikba, Blažek, myself, and recently Ruhlen) are scientists. There is nothing extraneous compelling us to classify Basque with the Dene-Caucasic languages, contrary to what Trask imagines. We have applied scientific methods to the data, and the evidence we have found, lexical, grammatical, and phonological, is decisive. Now, with morphological parallels and recurrent sound correspondences running through this evidence, the case has become compelling.

Basque is, happily, not isolated at all. With every day that passes, it becomes increasingly clear that it is connected with other languages (Caucasic, Burushic, Sino-Tibetan, Yeniseian, Na-Dene) by 'innumerable threads' (to borrow Edward Sapir's phrase). Basque is in fact indispensable as the only surviving remnant in the far west of the once vast Dene-Caucasic macro-family. Recognizing this will not only solve some of the mysteries of Basque, it will also shed new light on the prehistory of Eurasia and of North America.

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[1] Since the former 'South Caucasic/an' is now called Kartvelian, 'Caucasic' henceforth refers to the former 'North Caucasic' (Abkhazo-Adygean + Nakho-Dagestanian; see NCED).

PHONETIC GUIDE

dˡ, tˡ(ʼ)	lateral affricates
G	(Caucasic) voiced uvular stop; (Bsq) a velar or uvular fricative
γ	voiced velar fricative
ħ	voiceless pharyngeal fricative
ʕ	voiced pharyngeal fricative
ɦ	voiced laryngeal fricative

ʔ	glottal stop
ʔ̣	emphatic glottal stop
ǰ	voiced hushing affricate
ł	voiceless lateral fricative
p', t', k' etc.	glottalized consonants
x	voiceless velar fricative
X	voiceless uvular fricative

(For other unusual phonetic symbols, see NCED.)

Abbreviations

AN	Alto Navarro (Bsq)	PDC	Proto-Dene-Caucasic
B	Bizkaia	PEC	Proto-East-Caucasic
BN	Basse Navarre (Bsq)	PNC	Proto-North-Caucasic
Bsq	Basque	PST	Proto-Sino-Tibetan
Bur	Birishaski	PTB	Proto-Tibeto-Burman
C	Common (Bsq)	PYen	Proto-Yeniseian
G	Gipuzkoa (Bsq)	S	Souletin (Bsq)
L	Lapurdi (Bsq)	Sino-Dene	Bengston 1994b
LCD	Blažek & Bengston 1995	SSEJ	Starostin 1995
NCED	Nikolyev & Starostin 1994		

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INDO-EUROPEAN *b

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IN TAKING UP the issue of the phoneme *b* in Indo-European (IE), one must have recourse to both internal and external evidence (Hodge 1990a:642). The former consists of the data provided by extant documents in IE languages. The evidence external to IE is that provided by cognates in languages related to IE. Without prejudice to other approaches, these cognates are here restricted to Afroasiatic (AAS). The IE evidence has been subject to analysis and re-analysis by Indo-Europeanists. With a few notable exceptions, they have generally ignored the AAS relatives.

Within IE there are a lot of *b*'s. These may be divided into four main categories: 1. *b* assumed to be from proto **b*, e.g., Lat. *trabem* 'house', Osc. *tríibúm*, Lith. *trobà*, OHG *dorf* 'village' (Kent 1932:111). 2. Germanic, Slavic and Iranian *b* corresponding to Skt. *bh*, Gk. *ph*, Lat. *f*, etc., e.g., Eng. *bear* 'carry', SC *bèreem* 'I gather', Pers. *míbæræm* 'I carry', Skt. *bharāmi* 'I carry', Gk. *phérō*, Lat. *ferō*. The correspondences are regular, but the reconstruction may well be debated. That is, where *b* occurs, it is not necessary to derive it from **bh*. It may have been from a glottalized $b^{ʔ}$ or a pharyngealized *ḅ*. 3. *b* alternating with *m* or *mb*, e.g., Gk. *blōskō* 'I'm going', *émblōka* 'I went'. This has been explained by consonant ablaut (Hodge 1986:157–58). The idea that the *b* was anaptyctic is ad hoc and less satisfactory.

We come, then, to 4. *b* alternating with *v* or *w*. It is with the *b*'s of this category that we are here concerned. Such alternation may be (1) random, (2) occurring in specific roots, (3) phonologically conditioned.

An excellent example of random alternations is found in Sanskrit. The *b/v* ones are only one of many cited by Bloomfield and Edgerton in their Vedic Variants: *p~v, ph~v, p~m, b~v, bh~v, v~m, b~m, bh~m*, etc. (1932:105–25 [labials]). Of *b ~ v* they say, 'This wide-spread interchange, tho partly graphic, is largely phonetic, and very common in later times' (109). Examples are *abādhus* for *avādhus* 'they have put away' (109), *pības~pīvo* 'fat' (111), *bṛh~vṛh* 'tear' (112, with uncertainty expressed as to whether *v* or *b* is original), *bāla~vāla* 'child' (113). Bloomfield and Edgerton try to determine whether *b* or *v* is the original. For our purpose here, it is the fact of the alternation which is important.

The alternation occurs in early Iranian, as we see from Old Persian *zbā-* 'call', Avestan both *zbā-* and *zav-* (Kent 1953:211). Gathic Avestan has *aibi* 'hitherto', later Avestan *aiwi* (Geiger & Kuhn 1901, vol. 1:163, who take the *w* of *aiwi* back to proto Iranian **w* [185]; cf. Skt. *abhi*). These examples show both alternation within a language (which may be synchronic or diachronic) and alternation between related languages.

The situation is not as clear in Hellenic because *w*, written with ϝ (digamma) was lost at an early period. What we frequently get is *b* in one dialect but no contemporary *w* in other dialects. Beginning in the fifth century B.C. we have examples such as

Laconian	*probeipāha*	Attic	*proeipásas*
Corcyrian	*orbos*, earlier *orϝos*		*hóros*
Elean	*boikíar*		*oikíās*
	(Buck 1955:47)		

Buck and others interpret the spellings with *b* as due to the shift of *b* to a fricative, a change known to have been well established by the first century B.C. I suggest that these early spellings with *b* for *w* are to be taken as writings of the stop *b*, and that the fricativization of *b* came later. Curtius discusses spellings with *br* for *wr*, both in the dialect of Lesbos and in Attic Greek (1886, vol. 2:217, see also Buck 1955:51). An example is *bróda* in Sappho where Attic has *hróda* 'roses'. Curtius' explanation, a 'hardening' of the *b* before *r*, is phonologically unacceptable (see discussion in Allen 1968:28–30, 46, 48).

Italic (and later Romance) furnishes us with numerous *b~v/w* alternations. Between languages we find Lat. *vivos* 'living' Oscan *bivus* (nom. pl.) (Sommer 1948:38). Within Latin, *b* and *v* are found alternating in inscriptions by the first century A.D. This has, as for Greek, been attributed to a shift of *b* to a fricative, but the situation is not that simple. On giving an example of *serbus* for *servus* 'slave', Sommer calls attention to Lat. *corvus* 'raven', French *corbeau* (1948:163). In the latter instance there is no question about the stop quality of the *b*. Another example is Lat. *curvāre* 'to curve', Fr. *courber*.

In like manner we find that certain Latin words with initial *v-* have *b-* in Portuguese (Williams 1962:59). On the other hand we have the *b~β* alternation frozen into a phonological pattern in Spanish, with the stop in initial and postconsonantal position and the fricative after vowels. Such developments presume the existence of both the stop *b* and a spirant in the Latin period.

A similar distribution, with stop *b* in initial position and *w* after vowels, occurs in Armenian (Beekes 1995:127).

In Old Irish there are spellings with *b* which are taken to be bilabial fricatives [β], e.g., OIr. *berb(a)id* 'boils', Welsh *berwi*, Lat. *fervere* (cf. the first century A.D. spelling of the perfect, *ferbui*, Sommer 1948:572), *tarb* 'bull', W. *tarw*

(Thurneysen 1980:122–23, which see for other examples). These may rather have reflected a stop pronunciation.

To illustrate the *b*~*v/w* alternation in a specific root, the often-used example of the IE root for 'two' is used (cf. Hodge 1983:39). Some of the attested forms are

Avestan	*âṭbitîm*	'twice'	*bitya*	'second'	
Latin	*dwis*	'twice'	*bis*	'twice'	Gk. *dis* 'twice'
			biennium	'biennium'	/*diennium*
Milyan	*tbi-*	'two'			
English	*twice*				

The first column shows clearly that the alternation is between *b* and *w*. Reconstruction calls for *b*. Assuming ***db-* as the root, we see that column two drops the *d* and that column three drops the *b*.

These data, all within IE, show widespread alternation between a stop *b* and a spirant *v* or *w* and point to a proto stop ***b* as the source of such alternations. The spirant is clearly a secondary development. As it is the dominant one in the early attested IE standard languages, the shift to *v/w* must be pre-IE. In early attested IE there also existed, all over the area, dialects which kept the stop *b*. These dialect *b*'s are sporadically reflected in the written records.

The external, comparative evidence strongly supports this view. There was, of course, a proto-Lislakh (LL) ***w*, e.g., ***w* (first person) (Hodge 1987: 94–95), IE **we-* in Eng. *we*. There are far more numerous cases in which AAS ***b* corresponds to IE **w* (as traditionally reconstructed from standard spellings with *w*). The following list gives some of these, using where available just the reconstructed forms. Most have been treated elsewhere, as the references show. The list could be greatly expanded were different consonant ablaut forms used.

(1) ***b-C* 'enter, exit' IE **wei-* 'to go after something' (Hodge 1990b:172; Watkins 1985:74).
(2) ***b-C* (negative) IE **eu-* 'lacking, empty' (Hodge 1990b:171–72, 1986:148–49).
(3) ***b-k* 'bend' IE **wek-* 'bend' (Hodge 1992b:293, 1986:150).
(4) ***b-k* 'vocalize, cry out' IE **wekw-* 'speak' (Hodge 1992b:293, 1986:150).
(5) ***b-l* 'burn, shine' IE **wel-* 'warm', **wle-k-* 'shine', **s-wel-* 'burn, shine' (Hodge 1992b:293, 1986:150).
(6) ***b-l* 'cut off' IE **wel-* 'tear, wound' (Hodge 1992a:17, 1992b:294).
(7) ***b-l* 'eye, see' IE **wel-* 'see' (Hodge 1992b:171).

(8) _**b-l_ 'wet' IE _*wel-k-_ 'wet' (Hodge 1988:273).

(9) _**b-l_ 'wisp' IE _*wel-_ (in words for hair and wool) (Hodge 1981:372, 1992a:18).

(10) _**b-s_ 'flow out' IE _*wes-_ 'wet'. Add Ch. _*b-s_ 'wash' (Jungraithmayr & Ibriszimow 1994, vol. 1:174; Hodge 1981:372, 1992a:18)

(11) _**b-s_ 'on, (put) on' IE _*wes-_ 'clothe' (Hodge 1991:146, 1992a:18).

(12) _**b-w_ 'foot, place, in, from' IE _*wi-_ 'apart' (Hodge 1991:156–57, 1994:531–32, 1995:636–37).

(13) _**d-b_ 'marginal' IE _*dwo-_ 'two' (Hodge 1983:39–41).

(14) _**g-b_ 'bend' Eg. _g-b_ 'to bow', Sem. _*g-b-b_ 'be bent', ECh _*gwab-_ 'bend', SA (Cu) _*gub_ 'be bent'. IE _*gēu-_ 'bend' (Leslau 1987:177 [Sem.], Orel & Stolbova 1995:212 [ECh, SA, sub _*gob-_ 'bend']; Watkins 1985 [IE]).

(15) _*gub-_ 'burn' IE _*g(e)u-lo-_ 'a glowing coal' (Orel & Stolbova 1995:219 [AAS]; Watkins 1985:20 [IE]).

(16) _**g-b_ 'call out' Eg. _s-g-b_ 'cry out', Sem. Ar. _lajabun_ 'noise, tumult', Ch. _*g-b_ 'teach, show'. IE _*gou-_ 'call out' (Jungraithmayr & Shimizu 1981.262, 227 [Ch.], Hodge 1986:154 [IE]).

(17) _**g-b_ 'cut, grind, dig' Sem. _*g-b-b_ 'cut off; pit', Ch. _*g-b_ 'cut', Cu. _*gub-_ 'grind'. IE _*geu-_ 'chew' (Leslau 1987:176 [Sem.], Jungraithmayr & Ibriszimow 1994, vol. 1:45 [Ch.]; Ehret 1987:21 [Cu.]; Watkins 1985:26 [IE])

(18) _**g-b_ 'side, arm, hand' Eg. _g-b-ȝ_ 'arm', Sem. _*g-b(-)_ in G. _gabo_ 'side' etc., NA (Cu.) _*gəb-_ 'side'. IE _*gowə-_ 'hand' (Leslau 1987:176 [Sem.]; Ehret 1987:88 [Cu.], Pokorny 1959:403 [IE]; cf. AAS _*gabaʔ-_ 'hand, arm' [Orel & Stolbova 1995:194, mistaking Eg. _ȝ_ for _ʔ_]).

(19) Sem. _*g-b-l_ in G. _gablā_ 'gutter, pitcher' etc. IE _*gwel-_ 'to drip down' (Leslau 1987:177–78 [Sem.]; Pokorny 1959:471 [IE]).

(20) _**k-b_ 'bend' Sem. _*k-b-b_ in G. _kababa_ 'encircle' etc., Ch. _*k-b_ 'close, cover'. IE _*keu-_ 'bend' (Leslau 1987:273 [Sem.]; Jungraithmayr & Shimizu 1981:71 [Ch.]; Hodge 1986:155 [IE])

(21) _*kab-_ 'burn, roast' IE _*kēu-_ 'burn' (Orel & Stolbova 1995:307 [AAS]; Hodge 1986:157 [IE]). On AAS _b/w_ here see Hodge 1992b.

(22) _**k-b_ 'flow', _*kab-_ '(gourd) vessel', Cu. _*kuB-_ 'pour'. IE _*akwā-_ 'water' (Hodge [base **k-b]; Orel & Stolbova 1995:307 [AAS]; Ehret 1987:30 [Cu.]; Hodge 1986:155 [IE])

(23) _**k-b_ 'sole, hoof', _*kab-_ 'shoe, sandal'. IE _**k-w_ in Lith. _koja_ 'foot, Skt. _kavayí_ 'walking fish', _*ekwo-_ 'horse'. _**k-b_ 'two' (Hodge 1989:17 [AAS, IE]; Orel & Stolbova 1995:307 [AAS]; Hodge 1983:39–41 [IE 'two'])

(24) ***l-b* 'burn', Eg. *ꜣ-b-w* 'brand', Tna (Sem.) *lablaba* 'flame', Ch. **l-b-n* 'charcoal'. IE **leu-k-* 'shine, light' (Hodge 1992a:20 [Eg.]; Leslau 1987:308 [Sem.]; Jungraithmayr & Shimizu 1981:64 [Ch.]; Watkins 1985:37 [IE]).

(25) ***l-b* 'heart, innards' IE **l-w* in Lith. *pi-lva-s* 'belly', Eng. *liver* (Hodge 1991:158).

(26) ***l-b* 'pierce' IE **leu-* 'cut off' (Hodge 1992c, an extended treatment).

(27) **seb-* 'flow, pour' IE **seu-* 'juice' (Orel & Stolbova 1995:467 [AAS]; Pokorny 1959:912 [IE]).

Attention should also be drawn to Linus Brunner's list of Sem. *b* IE *w* correspondences (1969:28–31). Correlations of the foregoing list to his (by number) are 7–82, 9–88, 85, 21–95, 27–102. He also has Sem. *b*~IE *b, bh.*

As in the case of the internal evidence, the logical choice for a proto phoneme from which *b, v* and *w* may derive is ***b*. There is no evidence in any of the above data to support the glottalic hypothesis that IE **b* was glottalized. The relative rarity of reconstructed **b* is because of the general shift to *w*.

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COMPLEX NUCLEI AND MORPHOPHONEMIC ABSTRACTION IN CENTRAL ALASKAN YUP'IK ESKIMO

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1. FOUNDATIONS. Central Alaskan Yup'ik,[1] an Eskimo language spoken in the southwestern part of the Alaskan mainland, has a seemingly simple vowel system. As illustrated by the data of Table 1, there are four simple vowels that, can occur alone in a nucleus, and there are complex nuclei which contain any combination of two vowels from the set /i a u/, commonly called 'prime vowels' by Eskimologists. Table 2 presents a phononic analysis of these nuclei—a componentiation in the stratificational tradition, whereby each vowel contains a phonon /Vo/ (vocalic). The unmarked vowel /ɨ/ has no other phonons, while each of the prime vowels contains an additional phonon to differentiate it.

As it happens, this rather trivial foundation forms the basis for some fairly involved alternations affecting complex nuclei. While the level of MORPHONS (morphophonemes) may show no discrepancy in relation to complex nuclei, so that they realize simple vowels in juxtaposition, there are several other cases where such nuclei result from an interaction of vowel and consonant morphons. The simplest of these is SMOOTHED REALIZATION, as illustrated by the data of Table 3.

The noun meaning 'red fox', in the first column, shows several consonantal alternations: voiceless postvelar stop finally, voiceless postvelar fricative before voiceless, and voiced postvelar fricative elsewhere. The other three words work the same way for the Absolutive, Locative, and Equative cases, but differ in the remaining forms. The last two forms, both possessives, are the ones with smoothed realization, with the two vowels appearing in sequence without the expected voiced postvelar fricative between them. These words differ from 'red fox' in that the final syllable of their stems contains a simple nucleus rather than a complex one. This is the crucial factor, since sequences of three or more vowels are not found. A preliminary formalization of this phenomenon is given in Figure 1. This specifies that the voiced postvelar fricative morphon is subject to zero realization (here labeled ^{P}/H/ in phonotactics) between single prime vowels.

/ɨ/	/**ɨ**na/	house	/n**ɨ**qa/	fish
/i/	/**i**ŋʁiq/	mountain	/ak**i**/	coin
/a/	/p**a**tu/	lid	/nun**a**/	village
/u/	/**u**luaq/	woman's knife	/mikɨlŋ**u**q/	child
/ii/	/q**ii**ʁɨt/	gray hairs	/pist**ii**/	3SING's servant
/ia/	/ak**ia**/	3SING's value	/q**ia**γut/	they cry
/iu/	/c**iu**n/	ear	/niχk**iu**/	eat it! (future)
/ai/	/p**ai**χtuq/	licks	/nun**ai**/	3SING's villages
/aa/	/**aa**na/	mother	/aŋy**aa**/	3SING's boat
/au/	/m**au**ʁluq/	grandmother	/ɨγ**au**q/	cooks/boils
/ui/	/**ui**/	husband	/aq**ui**γut/	they play
/ua/	/t**ua**ni/	there	/atk**ua**/	3SING's parka
/uu/	/av**uu**/	supplement it!	/k**uu**fiaq/	coffee

Table 1. Examples of nuclei in Central Alaskan Yup'ik

SIMPLE NUCLEI	/ɨ/	/i/	/a/	/u/
	/Vo/	/Vo Fr/	/Vo Lo/	/Vo Lb/
COMPLEX NUCLEI	/ii/	/ia/	/iu/	
	/VoVo FrFr/	/VoVo FrLo/	/VoVo FrLb/	
	/ai/	/aa/	/au/	
	/VoVo LoFr/	/VoVo LoLo/	/VoVo LoLb/	
	/ui/	/ua/	/uu/	
	/VoVo LbFr/	/VoVo LbLo/	/VoVo LbLb/	

Table 2. Phononic analysis of Central Alaskan Yup'ik nuclei

The relative case forms of the same three nouns from Table 3 show LEVELED REALIZATION, so-called because it always involves two identical vowels. Here there is again zero realization of the postvelar fricative, but the vowel /ɨ/ cannot enter into complex nuclei, and instead we get a vowel identical to the first one. The preliminary formalization of this is given in Figure 2, with /L/

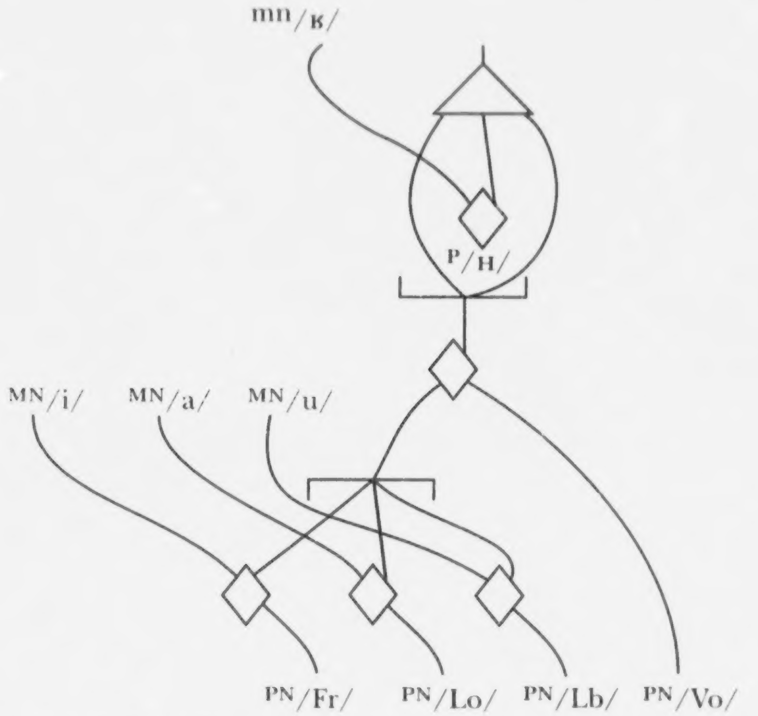

Figure 1: Preliminary account of smoothed complex nuclei.

	RED FOX	HAIR SEAL	MOUSE	GRANDMOTHER
ABSOLUTIVE	*kaviaq*	*nayiq*	*avɨlŋaq*	*mauʁluq*
LOCATIVE	*kaviaʁmi*	*nayiʁmi*	*avɨlŋaʁmi*	*mauʁluʁmi*
EQUATIVE	*kaviaχtun*	*nayiχtun*	*avɨlŋaχtun*	*mauʁluχtun*
RELATIVE	*kaviaʁɨm*	*nayiim*	*avɨlŋaam*	*mauʁluum*
3SINGPOSABS SG	*kaviaʁa*	*nayia*	*avɨlŋaa*	*mauʁlua*
3SINGPOSABS PL	*kaviaʁi*	*nayii*	*avɨlŋai*	*mauʁlui*

Table 3. Forms of noun stems ending in morphonic ^{MN}/ʁ/.

as the label for the zero consonant. The second vowel, realizing ^{MN}/ɨ/, is shown to reduplicate the positional component of the first vowel.

2. REFINEMENT. Each of the accounts in Figures 1 and 2 is a step toward treating this material, but when further data is considered, each of them runs into some problems requiring refinements. These preliminary accounts are both based on the assumption that sequences of single vowels separated by the voiced postvelar fricative do not exist in the language. This premise, however,

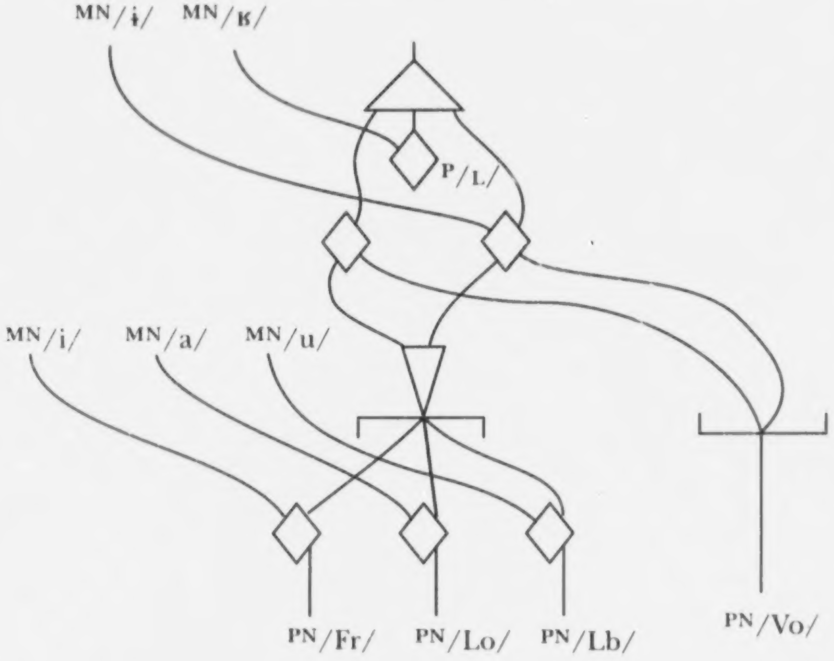

Figure 2. Preliminary account of leveled complex nuclei

is incorrect, as is proven by the data in Table 4. This table illustrates every logical possibility of single vowel plus postvelar fricative plus single vowel, requiring some revision of the provisions of Figures 1 and 2. In the case of smoothed realization, one needs first to examine some further examples of the suffixes involved in the possessive forms from Table 3. The relevant data is given in Table 5, which shows that when the stems end in single vowels, as in items 1 through 4, the suffixes are /a/ and /i/, just as in Table 3, but where there is a complex nucleus at the end of the stem, the suffixes begin with a velar nasal, assuming the shapes /ŋa/ and /ŋi/.

Based on this, it might be hypothesized that the suffixes begin with the velar nasal on the morphonic level. This hypothesis runs into the same problem, however, as the one involving postvelar fricatives between single vowels, since the data in Table 6 clearly indicates that the velar nasal can occur between single vowels, just as the postvelar fricative can.

Based on these facts, the most reasonable conclusion is that an abstract morphonic distinction is needed to treat these forms. There is both a constant $^{\text{MN}}$/ŋ/ and an alternating element $^{\text{MN}}$/Ŋ/.

iʁiŋqaua	it is slanted	uq**uʁiɬ**χuuq	3SING was fat
ni**ʁa**χtuq	3SING is crossing	y**uʁa**χtuq	3SING dances
iʁuq	leg	t**uʁu**n	sled-bed slat
mi**ʁi**spaχtuq	3SING is vomiting copiously	**uʁiɬ**χuuq	3SING is melting
yuŋc**aʁi**sta	doctor	**iʁi**taχtuq	3SING plucks
c**aʁa**yak	bear	q**iʁa**ʁun	sail
n**aʁu**χtuq	3SING is disobeying	t**iʁu**	foot of bed
t**aʁi**ŋʁiuχtuq	3SING looks at 3SING's reflection	n**ɨʁi**sta	louse

Table 4. Examples of /ʁ/ between simple nuclei

	SINGULAR	PLURAL	
1	akia	akii	'coin'
2	ucia	ucii	'load'
3	patua	patui	'lid'
4	tuntua	tuntui	'caribou'
5	uiŋa	uiŋi	'husband'
6	qaiŋa	qaiŋi	'surface, top'
7	paiŋa	paiŋi	'(river) mouth'
8	ciuŋa	ciuŋi	'front'
9	iiŋa	iiŋi	'eye'

Table 5. Third-singular possessive forms of nouns with vowel-final stems

The examples in Table 6 contain ^{MN}/ŋ/, while the possessive suffixes begin with ^{MN}/Ŋ/ The latter morphon is realized as /ŋ/ after a sequence of two vowels, and otherwise it is realized as zero.

Essentially, this abstract difference is analogous to what is found in one traditional treatment of the difference in English between the constant morphophonemic /f/ in *fife/fifes* and the alternating /F/ in *life/lives*, which is further distinct from the constant /v/ in *hive/hives*. This treatment goes back at least to Swadesh and Voegelin 1939. Historians of English are aware, of course, that the alternation of /f/ and /v/ is a residue of the subphonemic status of fricative voicing in Old English, and the forms with constant /f/ or /v/ are generally the result of borrowing, analogical changes, and some internal developments which led to a distinction between /f/ and /v/ (and a voicing distinction for English fricatives in general) Since speakers are not usually aware of such histories, however, a synchronic account does not properly recapitulate them, but rather focuses on the alternations observable in

ciŋiq	shoelace	c**uŋi**tuq	3SING is whining
ciŋaχtuq	3SING kisses	**uŋa**k	beard hair
kiŋu	back part	t**uŋu**ɬχuuq	3SING was black
ciŋɨɬχuuq	3SING pushed	t**uŋɨ**ɬquq	relative
aŋitaa	3SING unties it	n**iʁi**q	share
c**aŋa**tuq	something is amiss	q**iŋa**q	nose
aŋutɨt	men	p**iŋu**q	hill
aŋɨq	chewing gum	t**iŋɨ**ɬχuuq	3SING flew away

Table 6. Examples of /ŋ/between simple nuclei

the speakers' behavior, and attempts to infer the relationships which seem to underly this behavior. So the distinction between the morphons /f/ and /F/ in English is not properly viewed as a pseudo-phonetic matter of any kind. It is a functional difference based on the different behaviors seen in the morphemes containing them in various environments. The same is true of the distinction between the morphons /ŋ/ and /Ŋ/ in Yup'ik

Once the morphon $^{\text{MN}}$/Ŋ/ is posited at the beginning of the possessive suffixes, it becomes possible to salvage the account in Figure 1 by using the sequence $^{\text{MN}}$/ʁŊ/ as the realizate of the zero-consonant labeled $^{\text{P}}$/ʜ/ in smoothed realization. The morphonic shapes of the possessive forms from Tables 3 and 5 are presented in Table 7.

The same consideration does not help, however, in the case of leveled realization, There is no evidence that $^{\text{MN}}$/Ŋ/ can be posited here, since the

	SINGULAR	PLURAL	
1	kaviaʁŊa	kaviaʁŊi	'red fox'
2	nayiʁŊa	nayiʁŊi	'hair seal'
3	avɨlŋaʁŊa	avɨlŋaʁŊi	'mouse'
4	mauʁluʁŊa	mauʁluʁŊi	'grandmother'
5	akiŊa	akiŊi	'coin'
6	uciŊa	uciŊi	'load'
7	patuŊa	patuŊi	'lid'
8	tuntuŊa	tuntuŊi	'caribou'
9	uiŊa	uiŊi	'husband'
10	qaiŊa	qaiŊi	'surface,top'
11	paiŊa	paiŊi	'(river) mouth'
12	ciuŊa	ciuŊi	'front'
13	iiŊa	iiŊi	'eye'

Table 7. Morphonic shapes for possessives in Tables 2 and 3

	ABSOLUTIVE SG	RELATIVE SG	
1	aki	akim	'coin'
2	uci	ucim	'load'
3	patu	patum	'lid'
4	tuntu	tuntum	'caribou'
5	ui	uim	'husband'
6	qai	qaim	'surface, top'
7	pai	paim	'(river) mouth'
8	ciu	cium	'front'
9	ii	iim	'eye'

Table 8. Some forms of nouns with vowel-final stems

relative case forms of vowel-final stems simply lack the final vowel, as demonstrated by the examples in Table 8. Here once again, there is a case for an abstract morphonic distinction, this time a vowel difference. The constant morphonic $^{\mathrm{MN}}$/ɨ/, seen after the voiced post-velar fricative in the last member of each grouping in Table 4 is opposed to a different morphon which is subject to zero realization after a vowel, and is also subject to the leveled realization discussed here. This second morphon is labeled $^{\mathrm{MN}}$/e/ (based on the Yup'ik orthography for /ɨ/) The morphonic shape of the absolutive suffix is then $^{\mathrm{MN}}$/em/. So by the use of this morphon for some cases of /ɨ/, Figure 2 can also be made viable

It also needs to be pointed out here that the Yup'ik alternations provide a much better case for morphophonemic abstraction than the English examples presented above. This is because of the much richer role of morphology in Yup'ik (as in other Eskimo languages) in comparison to English. Given the assumption that morphophonemic generalization is always justifiable to the greatest extent possible, either example would be equally good. Others may argue, however, that the English alternation of /f/ and /v/ is so limited (as is English inflectional morphology in general) that the words could readily be learned as exceptions, and treated in the same manner as true suppletions, in view of their lack of productivity.

The Yup'ik situation is much different, however, because these examples are totally productive parts of the inflectional system. Specifically, the examples used here come from the noun inflections, which for a given countnoun has 273 theoretically distinct forms, reflecting case, number, and possession.[2] Via certain systematic syncretisms, this total is reduced to 203 actually distinct forms, still a fairly formidable number. In such an instance, it is hard to imagine that the speaker could get by on simply memorizing all the forms for each noun. There is no alternative to internalizing a SYSTEM if one is going to control a language with this kind of morphological complexity.[3]

3. ALTERNATIVE ABSTRACT TREATMENTS. One possible alternative treatment of these phenomena is not ruled out by the data, and is worth considering here. Such an account would exploit the fact that the alternations leading to the positing of $^{\mathrm{MN}}$/Ŋ/ and $^{\mathrm{MN}}$/e/ are all suffix-initial. If the suffix boundary were to be treated as an additional morphon, it would be possible to use $^{\mathrm{MN}}$/-ŋ/ and $^{\mathrm{MN}}$/-ɨ/ (where $^{\mathrm{MN}}$/-/ is used for the boundary morphon) in place of these two. Such an alternative is more in line with what one would find in the generative tradition, which regularly makes use of morpheme boundaries. It remains to be seen, however, how it can fit in a relational network model.

In general, stratificational phonology has been open to the use of boundaries in its accounts of morphophonemic phenomena. Lockwood's work on accent and clitics (1979, 1983, 1987, 1990), for example, has regularly used a grammatical word boundary $^{\mathrm{MN}}$/+/ and the work on clitics in particular has uncovered a need for special clitic boundaries in some languages. Sullivan's work on Russian phonology (1969) has also argued cogently for the postulation of a morphonic desinence boundary to separate a stem from an inflectional suffix complex. It has not been usual in the stratificational tradition, however, to posit morpheme boundaries as morphons, and all information made available by the morphology of a language to its phonology must, in this model, be encoded in morphons.

Within the relational framework, it has seemed very wasteful to use boundaries that are not really needed. In the present case, the use of $^{\mathrm{MN}}$/-/ would simply set up complexes beginning with this element in place of the two special morphons, and a comparison of relational networks shows that this would simply add an unnecessary complication.[4]

When it comes down to it, there is no reason to object to the extra abstraction involved in $^{\mathrm{MN}}$/Ŋ/ and $^{\mathrm{MN}}$/e/ unless their recognition multiplies entities (or, more accurately, relations) beyond necessity. Ordinary $^{\mathrm{MN}}$/ŋ/ and $^{\mathrm{MN}}$/ɨ/ are, after all, no more actual sounds than their 'abstract' counterparts, but only relatively less abstract in terms of their connections to phonetics. Ultimately, a linguistic system is a set of relationships whose knowledge enables a person to express and understand messages. It relates mental correlations that in turn relate to ideas and sounds (or alternative means of expression), but it does not contain either ideas or sounds as such.

[1] This paper is based primarily on data from Reed et al. 1977 and Jacobson 1984. Deepest thanks are due to John H. Koo, Professor Emeritus from the University of Alaska—Fairbanks, for interesting the author in the phonology and morphology of Central Alaskan Yup'ik and for providing most of the books and other materials on which this study was based

[2] There are seven cases (here termed ABSOLUTIVE, RELATIVE, EQUATIVE, LOCATIVE, ALLATIVE, ABLATIVE and PERLATIVE), three numbers (SINGULAR, DUAL, and PLURAL), and thirteen states of possession (UNPOSSESSED plus possession by any of four persons [the traditional three plus THIRD-REFLEXIVE] times the three numbers of the possessor).

[3] The oral version of this paper included brief discussion of two additional phenomena which come up with velar-final and some vowel-final stems: FRONTED REALIZATION and LOWERED REALIZATION. Accounts of these were presented in the appendix to the handout, where they were further integrated with smoothed and leveled realization into an overall treatment of complex nuclei. Space limitations have forced the omission of these matters here, but copies of the treatments can be obtained by writing the author c/o the Department of Linguistics and Germanic, Slavic, Asian and African Languages at Michigan State University, East Lansing, or by e-mail at lockwoo8@pilot.msu.edu.

[4] Item N on the handout for the oral paper compares the treatments with and without the boundary element for four suffixes, and the version without it can express with just six nodes what requires twelve nodes and four extra connections to express in the version with the boundary. This results largely from the fact that in the relational version a boundary must be shown as part of the spell-out for each affix containing it. Copies of this comparison may be obtained from the author at either of the addresses given above in note 3.

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INDO-EUROPEAN 'JAW, CHEEK, CHIN'

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LISTED BELOW are a number of words from various Indo-European languages which all seem to descend from a common root meaning 'jaw, cheek, chin'. This root was early reconstructed as **ǵen(u)-*, the shape which would seem to be required to account for the initial consonantism of the forms cited under (a). However, the Sanskrit form cited under (b) appears to reflect an initial aspirated stop **ǵh*. The forms cited under (c) could reflect either an aspirate or a non-aspirate initial.

a. Gk. *génus* 'jaw, cheek', *gnáthos/gnathmós* 'jaw, cheek', *géneion* 'chin', Lat. *genunus* 'molar', *gena* 'cheek', Goth. *kinnus* 'cheek', OE *cinn* 'chin', Arm. *cnawt* 'cheek, jaw'
b. Skt. *hánu-* 'jaw'
c. Av. *zanu-* 'jaw', Lith. *žándas* 'jaw', OIr. *giun* 'mouth', Toch A *sanweṃ* 'jaws (dual)'

A theory advanced by Pedersen (1926:48, note 1) and Kuryłowicz (1935:53–54) and widely accepted since then (e.g., Sturtevant 1942:86; Hoenigswald 1965:95) accounts for the unexpected *h* in this and several other Sanskrit words by positing an original sequence **ǵH* (or **gH*). However, in other examples it is clearly the *a*-coloring laryngeal which causes the aspiration of the preceding velar; cf. Skt. *duhitár-* 'daughter' vs. Gk. *thugátēr*, Skt. *máhi* 'big (neut. sg.)' vs. Gk. *méga*. The *a* of Greek corresponding with the *i* of Sanskrit must reflect an *a*-coloring laryngeal, as shown at great length by Beekes (1969) and more recently by Sihler (1988).

The difficulty in tracing Skt. *hánu-* back to a form *ǵAenus is that such a proto-form should have yielded reflexes with the root-vowel /a/ throughout Indo-European. Instead, an original short *e is reflected wherever this word occurs as a u-stem, except in Toch A *śanweṃ* (no cognate in Tocharian B), where short /a/ with palatalization of the preceding stop reflects long *ē (Winter 1965a:110). Winter states that 'this *ē can only be derived from *eE', since 'lengthened grade seems impossible to justify'. However, Adams (1988:110) notes that neuter nouns in Tocharian tend to have root accent with lengthened grade of the vowel. Since *śanweṃ* has been shifted from feminine to neuter in Tocharian, the lengthened grade *ē is indeed justified, as against the positing of earlier *eE.

Nevertheless, the Tocharian word, like its cognates in Greek, Latin, Germanic, and Celtic, simply cannot go back to a proto-form *ǵAenus with an *a*-coloring laryngeal in the first syllable. On the other hand, we can demonstrate that an original root form *ǵenHus, with some sort of laryngeal in the second syllable, must underly Goth. *kinnus* and its Germanic cognates. The key is the double *n* found in all the Germanic languages, which is usually attributed to the fact that this word is a u-stem (Lehmann 1986:218). Since PIE *-nw- goes to Proto-Germanic *-nn-, forms of the noun with accented vocalic suffixes would have naturally had a sequence *-nwV́-, leading to *-nnV́. The double *n* could then have been extended throughout the paradigm by analogy.

This explanation seems plausible until we realize that the sequence *-nw- would have occurred in the u-stems only in a few cases such as perhaps the genitive-locative dual. Moreover, not a single declined form of u-stems retained in Proto-Germanic descends from a form with PIE stem *w (Wright 1954:94). It is rather dubious to claim that a consistent double *n* is due to analogy from a few forms which may not even have existed in pre-Germanic at the time of the shift of *-nw- to *-nn-. Even if they did exist, the forms in question would certainly have been marginal within the paradigm and hardly likely to cause a remodelling of nominative, accusative, genitive, or dative singular and plural. Doubling of /n/ is also entirely lacking in *sunus*, the only other Gothic u-stem with a pre-stem n (Wright 1954:54–55). In short, the usual explanation for the double *n* of *kinnus* is remarkably unconvincing.

A far more convincing explanation assumes a postresonant laryngeal causing gemination of the resonant. This is exactly the explanation advanced by Lehmann (1952:36–46) to account for the Germanic Verschärfung, that is, for the Germanic gemination of *w and *y after short vowels in certain words. Lehmann's account of the Verschärfung is now standard. Obvious correlates to the development of *V̆wH, *V̆yH to *V̆ww, *V̆yy are *V̆rH, *V̆lH, *V̆mH, and *V̆nH to *V̆rr, *V̆ll, *V̆mm, and *V̆nn, respectively. Numerous examples of just such developments have been adduced by Seebold (1966), Eichman (1973), and especially Lühr (1976). The examples are sufficiently numerous, and the historical process itself sufficiently natural, that we can accept the double *n* of *kinnus* as the unremarkable result of a regular Germanic sound change involving postvocalic resonants plus laryngeals.

The implications for the reconstruction of the word are significant. Since the Germanic words are exactly cognate with the short u-stem nouns in the other languages, we must reconstruct a common inflected short-u noun for Indo-European. And since Germanic is hardly likely to have inserted a laryngeal randomly between root and stem, Gk. *génus*, Lat. *genuīnus*, etc. must descend from exactly the same root *ǵenHus. Skt. *hánu-*, on the other hand, indicates a proto-form *ǵHenus. Since the laryngeal in the first syllable is nowhere indicated outside of Indic, the most reasonable explanation is that the Indo-Iranian forms reflects a simple shift of the laryngeal to the first syllable.

The laryngeal can also be demonstrated in forms of the root other than *u*-stems. The acute accent of Lith. *žándas* requires a laryngeal (Watkins 1965:117), while the /a/ quality of the vowel indicates an *o*-grade form of the root. Fraenkel (1962–65:1289) reconstructs *ǵonH-dh-. Gk. *gnathós*, poetic form *gnathmós*, meaning primarily 'jaw' but also 'cheek', look very similar to *žándas*. At first glance, the Greek words would seem to represent *ǵnA-dh-, with vocalization of the laryngeal, which is the analysis accepted by Winter (1965a:111), although this is a problem for him since he mistakenly believes that Tocharian and Armenian require us to reconstruct *E rather than *A for this root. A problem for us is that vocalization of the laryngeal in a root-shape such as *gnAdh- is unexpected. We would expect such a root to have a syllabic resonant followed by a consonantal laryngeal in Proto-Indo-European, which would yield Gk. **gnāthós*, Attic Gk. **gnēthós*; cf. *gnḗsios* 'belonging to the race' < *gnEs-, connected with *génos* 'race' < *genE-. Yet we consistently find short /a/ in all dialects in *gnathós*. For this reason, Beekes (1969:190), expanding on Specht (1932:113 n.1), states that *gnathós* is a non-Indo-European word. In support of this conclusion, he mentions a large number of possibly non-Indo-European words in Greek that are only vaguely similar in form and hardly similar at all in meaning to *gnathós*, for example, *knṓdon* 'teeth on a hunting spear', *knōdálon* 'wild creature', and even *knáptō* 'to card (wool)'.

The fact is that *gnathós* means exactly 'jaw, cheek', and that it is far more similar in form and meaning to *génus* than to the other words that Beekes mentions. The only exception is a Hesychian gloss, *kánadoi* 'cheeks, jaws'. *Kánadoi* does indeed appear to be related to *gnathós*; it may be a Macedonian form despite the voiceless initial. But we can hardly attach much importance to a Hesychian word of uncertain provenance, as compared to the well-attested *gnathós*. In any case, to connect *kánadoi* to *knṓdon*, etc., is no more semantically reasonable than to connect *gnathós* to the same words.

We should also reiterate the similarity of Greek *gnathós* to Lith. *žándas*, a similarity which Beekes dismisses in favor of his far more dubious intra-Greek cognates for *gnathós*. In fact, *gnathós* and *zándas* are obvious cognates. If *gnathós* 'jaw' is semantically close enough to *knā́lon* that they must be related, then presumably *žándas* is also related to *knā́lon*. Thus, if *gnathós* is non-IE, then *žándas* (and its Latvian cognate *zuõds* 'chin, jaw') must be non-IE as well. This conclusion is especially to be rejected insofar as the Baltic words are the only reflexes of *genH- 'jaw, cheek, chin' in those languages, while their development from a presumed *gonHdh- is quite regular. Lastly, we cannot forget that words for body parts are rather basic vocabulary items, not the most likely candidates for borrowing, so that both Gk. *gnathós* and Lith. *žándas* are far more likely to be inherited words than not. In short, we cannot agree with Beekes' rejection of the Indo European ancestry of *gnathós* despite the seemingly divergent development of the sequence *CHRC-.

In any case, the development of *CHRC- in Greek is not so clear cut as Beekes (1969) states. Beekes (1988:74) grants that in anlaut, that is, in the sequence *#RHC-, the laryngeal rather than the resonant was vocalized, as in *makrós* 'long' < *mAḱros compared to *mē̂kos* 'length' < *meAḱos; this is a reversal of his earlier position on such sequences (see Beekes 1969:183). Moreover, if we accept the Indo-European origin of *glō̂ssa* 'tongue', Ionic *glássa*, as Beekes does (1969:246), then we seem to have an ablaut pattern *RCoAC- > *CRōC-, *CRAC- > *CRaC-. This is of course unacceptable to Beekes, so that he is required to posit a PIE ablaut between *-lo- and *-l̥- / * -l̥ - for this root and several others whose Greek reflexes show the same pattern. Yet perhaps the most significant contribution of the laryngeal theory to Indo-European linguistics is that it allows us to reduce the number of ablaut series reconstructed for the proto-language. For example, the /ō/-/a/ patterning of Gk. *phōnḗ* 'voice' vs. *phásis* 'utterance' is now understood as simply a regular distinctionbetween *ō*-grade and zero-grade, that is, *bhoA- vs. *bhA-. The exact same patterning is reflected in *glō̂ssa* vs. *glássa.* If acceptance of such an obvious conclusion requires us to admit that *CRHC- does not always give *CRC- in Greek, surely this admission is preferable to reestablishment of a PIE *o ~ Ø* ablaut pattern.

Gnathós, then, is an Indo-European word descended from a *dh-suffixed zero-grade form of the root *genA-. In form it is exactly parallel to Lith. *žándas*, except that the latter reflects *o*-grade rather than zero-grade in the first syllable. The Greek word is particularly valuable in allowing us to establish that the laryngeal in question was *A.

Lat. *gena* 'cheek', usually attested in the plural, is typically regarded as an analogical formation from pre-Latin **genus*, with influence from *māla* 'cheek-bone, jaw-bone' as well as the functional desire to distinguish 'cheek' from *genū* 'knee'. It is true the the *u*-stem *ǵenAus is reflected in Latin in the derivative adjective *genuīnus* (*dēns*) 'molar', but while it is still possible that *gena* is an analogical formation, it is no longer necessary to assume that it is. The common core that we have reconstructed thus far is *genA-, with later suffixes *-u and *-dh accounting for various developments. *Gena* could well be the unsuffixed reflex of what would appear to be an original feminine *ā*-stem.

However, we have not yet finished with the various Greek words. *Géneion* 'chin', a word with many derivatives in Greek, is somewhat troubling since it shows no sign of *a*-vocalism in the second syllable. That is, it looks like a regular development from *genew-yon, with a full-grade vowel in the second syllable followed by the suffix -yo-. From *genAewyon, on the other hand, we would expect the unattested **génaion*. However, *géneion* and its derivatives, unlike *génus* and *gnathós*, have no formal cognates outside of Greek. We are therefore safe in seeing them as purely Greek formations, with /e/ in the second syllable by analogy with the usual development of *u*-stems with the *-yo-* suffix (Buck & Peterson 1945:47).

The surface resemblance between Arm. *cnawt* and *gnathós* is particularly strong, but Gk. *th* should correspond to Arm. *d*, not *t*. The Arm. sequence *aw* is also problematic, since it could theoretically derive from at least six different sources (Greppin 1978). But not all of these sources are likely in this particular root. In several cases Arm. /aw/ derives from PIE *aw, as in Arm. *awčan* 'assistance' < PIE *aug-. Most modern Indo-Europeanists, including Greppin, would regard the initial *a of *aug- as the reflex of a laryngeal. That is, the root is actually *Aweg-/*Awg-. *Aweg- is reflected in Gk. *aéksō* 'to increase', but *awčan* must reflect the zero-grade *Awg-. *Awčan* cannot descend from a different form *Aewg-, since word-initially, this would have given Arm. **hawc-* (cf. *haw* 'grandfather' < PIE *Aew-, Greppin 1988:183–84). Thus we are certain that word-medial Arm. /aw/ can derive from either *Aw or *Aew. It follows that *cnawt* probably derives from PIE *ǵnAw- or *ǵnAew- with a dental suffix; in other words, it reflects *ǵenAu- with zero-grade in the first syllable. It is therefore more closely connected with the Gk. *u*-stem *génus* than with *gnathós*, but as in *gnathós*, the *a*-vocalism of *cnawt* reflects original *A.

A final word which must be considered is Gk. *génuks*, a word recorded only by Hesychius, who glosses it as *pélekus* 'axe'. The semantic connection between *génus* and *genuks* would seem shaky except that *génus* is attested with the meaning '(sharp edge of an) axe' in as basic an author as Sophocles. Thus the semantic match is exact, leaving us little reason to doubt this particular Hesychian citation. Moreover, on the formal side, *génus* is twice found in Euripides with a long *ū* in the accusative singular *génūn* (with the more basic meaning 'jaw' rather than 'axe').

This appears to be an excellent example of the variation between nom. sg. *-uks* and acc. sg. *-ūn* predicted by Martinet's (1955, 1956) theory of laryngeal hardening. Briefly, Martinet hypothesizes that in sequences such as *-uAs in PIE, the *A (phonetically [x] or something similar) hardened to *k, thus setting up paradigmatic alternations with other forms in long vowel, such as *–ūm < *uAm. *Génuks* and *génūn* are therefore probably reflexes of a metathesized doublet *ǵenuA- derived from *genAu-.

This further change of position on the part of the laryngeal may be disturbing to some readers. Thus far, we have posited a basic root *ǵenA-, with two basic suffixed forms *ǵ(o)nAdh- and *ǵenAu-. Based on the second of these, we have also posited *gAenu- to account for Skt. *hánu-* and *genuA- to account for Gk. *génuks/génūn*. The vast majority of the forms require no laryngeal movement, while those that do require movement seem to have started from *genAu-, where the laryngeal occurs in the sequence -RHR-.

To account for the mobility of the laryngeal, we might, following Winter (1965a:110, 1965c:191–93), turn to a theory of laryngeal metathesis which explains a certain variation in the attested forms of the word 'fire' in Tocharian and elsewhere. Toch B *pūwar*, along with such cognates as Gk. *pūr*, can derive only from PIE *puAr. But Toch A *por*, along with Hitt. *pahhur* et al., must be from *peAur. Winter theorizes that in the zero-grade, a *CHR- form like *pAur could be metathesized to *CRH-. Lindeman (1987:65–67), in a critical discussion of this hypothesis, notes that it leaves the short /u/ of forms such as the Greek genitive singular *purós* unexplained. Lindeman cites a suggestion of Kuryłowicz's that *purós* could derive from *pAurós, that is, the nonmetathesized zero-grade. If this is correct, then it would indicate that the metathesis posited by Winter would be irregular, sporadic, even within a single branch of Indo European, as is also indicated by the divergent reflexes in the two Tocharian languages. This irregularity is not a problem, since we are not surprised to find metathesis operating sporadically.

Winter's theory of laryngeal metathesis has neither been generally accepted nor generally rejected in the field. Beekes (1984:7) uses it in explaining Skt. *sū́ra-*, Av. *hūrō* (gen.) 'sun' < *suAl- as opposed to the nonmetathesized *seAul- /*sAul- attested elsewhere, including within Indo-Iranian (e.g., Skt. *svár-* 'sun'). But he comments parenthetically, 'I will not discuss the metathesis, which may have been different in the different languages, and which requires a broad investigation'. Similarly, Lindeman (1987:65) heads up his discussion of the theory by noting that 'the material which has led to the assumption of a "laryngeal" metathesis in Indo-European is not very clear and offers many phonologic and morphologic difficulties'.

In the light of these objections, we cannot state incontrovertibly that laryngeal metathesis as reconstructed in detail by Winter is responsible for the laryngeal movement posited above for *ǵenA-. Nevertheless, it remains the most reasonable hypothesis. Winter himself applies it to this very root, stating that Skt. *hánu-* < *gHenu- reflects not the original full-grade form of the root, but a full-grade based entirely on the zero-grade *ǵnHu- (1965a:110). *gHenu- would have been created by analogy with a set such as *peAur /*pAewr-/*puAr-. Winter assumes that the change of *CHR- to *CRH- was a regular one, which in fact seems unlikely, given the variation attested within languages. But the analogy he posits would still be entirely possible, and is probably the correct explanation here.

As for the metathesis evidenced by Gk. *génuks/génūn*, it, too, can be explained by Winter's theory. The sequence *-nAus/*-nAum, like *gnA-, is a sequence of *CHR-, and it meets Winter's further conditions (1965c:192) that no vowel immediately precede the laryngeal, that the laryngeal not be in initial position, and that the resonant be followed by a consonant. Thus the shift from *genAus/-m to *genuAs/-m requires no new theoretical apparatus.

A final note on Gk. *génus* is required before summarizing our conclusions to this point. There is good evidence, such as that from *thugátēr* 'daughter', that interconsonantal laryngeals were vocalized in Greek. But in solid examples such as this one, usually at least one, and most often both of the surrounding consonants are obstruents (Beekes 1988:72). In apparent exceptions such as *tolmáō* 'dare' < *tolA-m, the laryngeal is most frequently between two resonants. Lindeman (1987:104) points out that in PIE, the resonants *r *l *m *n *i *u were all inherently more sonorous than the laryngeals. Therefore, in a sequence *-VRHR-, we would not expect vocalization of the less sonorous element *H. This observation provides a cogent phonological explanation for the development of words such as *tolmáō*, which Beekes is unable to account for. The development of *genAus to Gk. *génus*, with ultimate loss rather than vocalization of the laryngeal, is therefore both regular and phonetically natural.

We turn now to the conclusions to be drawn from the 'jaw, chin, cheek' root. First of all, there is evidence from Germanic, Greek, Baltic, Italic, and perhaps Armenian that the original form of this root was *ǵenA- and that the laryngeal was maintained in the u-stem *ǵenAu-. Since there is independent evidence that PIE *ǵA > Skt. /h/, the most reasonable explanation for Skt. *hánu-* is that the laryngeal has been transferred to the first syllable, probably via the mechanism outlined above. The only other ways of accounting for *hánu-* are as follows: (1) Reconstruct PIE *ǵEenAu-. This is a most unlikely looking root. Moreover, it requires what there is no other evidence for, namely a shift of *ǵE to Skt. /h/. A form *gAenAu- is of course impossible because the non-Indic words do not have a-vocalism. (2) Attribute the Sanskrit aspiration to borrowing from an unknown dialect, or suggest a desire to differentiate 'jaw' from 'knee', or suggest analogy based on an unknown source, or, most honestly, call the aspiration 'unexplained'. If, indeed, there were no other signs of a laryngeal in this root, calling the aspiration unexplained probably would be the wisest course. But in the face of abundant evidence for the *a*-coloring laryngeal in the root, the explanation given here for *hánu-* is superior to both of the alternatives.

This explanation is particularly important in that *hánu-* has hitherto been a problem for the theory that *ǵA/*gA give Skt. /h/. Mayrhofer (1986:139) is unable to account for the fact that, as he sees it, the other evidence indicates that *ǵA/*gA give /h/ but that this word plainly indicates *ǵE > /h/. As long as *hánu-* remained unexplained, it would remain a stumbling block for the theory that only the *a*-coloring laryngeal had this aspirating effect. Now the stumbling block is removed, and the general theory is much stronger.

A final topic which must be considered is whether this root provides any evidence that, at least in some phonetic enironments, the change of *ǵA to *ǵh occurred outside of Indic. In fact, there is one slight indication from *ǵenAus/*ǵAenus of *ǵA resulting in Gk. /kh/ , providing we accept that PIE 'jaw' and 'knee' are related. Without listing all of the cognates, which can be found in the standard etymological dictionaries, suffice it to say that the 'knee' root has traditionally been reconstructed as *ǵenu-, with various reflexes indicating a normal alternation between *e*-grade, *o*-grade, and zero-grade for the first syllable. Semantically, the relation between 'jaw' and 'knee' is the same as that found between ModE *ankle* and Gk. *ankúle* 'bend of the arm, wrist; bend of the knee', both of which descend from a root *ang-/*ank-. Semantically as well as formally, then, the resemblance between PIE 'jaw' and PIE 'knee' is quite strong. As a result, qualified acceptance of the connection (e.g., Buck 1949:22) is more prevalent than qualified rejection (e.g., Frisk 1973:1.321).

The conclusion that 'knee' is connected with 'jaw' will be more secure if we can demonstrate that 'knee' should be reconstructed as *ǵenAu-, rather than simply *ǵenu-. We begin with Lat. *genū*, where the long *ū* might be taken to reflect earlier an *uA resulting from laryngeal metathesis. However, according to the ancient grammarians, long *ū* was the usual ending for all neuter fourth declension nouns in Latin. Buck (1933:199) and Leumann (1977:441) doubt that the ancient grammarians were correct in this regard, hypothesizing that they extrapolated incorrectly from a few definite cases in verse where the meter assures us that the *ū* was indeed long. Leumann states that there was a phonological, metrical cause for the lengthening in these cases; Buck, on the other hand, prefers to regard these examples as old duals or collective plurals. The latter would have been originally *genu-H, so if Buck is right, then even if the long *ū* of *genū* does indicate an earlier sequence *-uH, it still does not necessarily demonstrate a laryngeal in the root.

Since there are so few neuter fourth declension nouns in Latin (Leumann [1977:355] lists a total of five), and since it is hard to determine the origin of the long *ū* of the nominative singular which may not even be the regular ending, plainly *genū* cannot be taken as proof that PIE 'knee' must be reconstructed with a laryngeal. In Greek, however, there is somewhat better evidence. The basic Greek word for 'knee' is *gónu*; two related words of interest are *gnúks* and *prókhnu*, both meaning 'on the knees, kneeling'. *Prókhnu* also occurs with the meaning 'completely', but this is obviously a metaphorical extension (Chantraine 1968–80:233). *Gnúks* is usually regarded as analogous to adverbs with regular /ks/; e.g., *púks* 'with the fist' < *pug-s (Schwyzer 1959:620; Frisk 1973:1.317). But if Greek had formed such an analogous adverb from *gónu*, surely it would have been **gónuks* rather than *gnúks*. It is more likely that *gnúks* derives directly from earlier *gnuA-s, a form with laryngeal metathesis in the zero-grade.

Laryngeal metathesis could also have given *ǵAnu-. Word-initially, the sequence *ǵAnu- would presumably have yielded Gk. **gánu-*, but in *prókhnu* the sequence occurs postvocalically. Moreover, it was probably postvocalic already in PIE, since Homeric *prókhnu* seems to have exact formal cognates in Skt. *prajnu-*, Av. *frašnu-*, words whose exact meanings are unclear but which certainly have something to do with the bended knee (Frisk 1973:2.605; Lehmann 1986:220; Monier-Williams 1899:659). Thus, here we seem to be dealing with PIE *prognAu-, with a metathesized variant *progAnu- yielding Gk. *prókhnu.*

If we do not accept *proǵAnu- as the origin of *prókhnu-*, then the aspirated /kh/ becomes extremely difficult to explain. Chantraine (1968–80:233) mentions a suggestion that it is 'expressive', not a very illuminating proposal. Schwyzer (1959:328) lists other hypotheses, none of which seems to have gained acceptance. But my own explanation remains highly questionable without further support, first in the form of other signs of a laryngeal in the root, second in the form of other examples of a Greek development of voiced nonaspirates to aspirates. The second type of evidence can be found in Chapter 4 of Pulju (1996). As for the first type, Gk. *gōnía* 'corner, angle' has typically been seen as akin to *gónu* (Liddell & Scott 1968:364; Chantraine 1968–80:233), but as Frisk (1973:1.337) points out, from pre-Gk. *gonwía we would expect Attic **gonía*, Ionic **gounía*. However, the attested long *ō* is explained if we assume *ǵonAwía > *ǵoAnwía. Similarly, the long *ū* of Gk. *ignū́a/ignū́e* 'part of the leg behind the knee and thigh' could be explained by a metathesis of *-nAu- to * nuA-, if this word is descended from *en-gAnu- (cf. Frisk 1973:1.708).

The long /ā/ of Skt. *jā́nu-* 'knee' is normally attributed to the action of Brugmann's Law; that is, *ǵonu- > *jonu- > *jā́nu-*. *Jā́nu-* could not derive from *ǵonAu-, since Sanskrit did not lengthen short *o before two consonants. But it could derive from *ǵoAnu- as easily as from *ǵonu-, so that the Sanskrit reflex does not preclude the reconstruction of a laryngeal in the root. Tucker (1931:109) cites Arm. *cunr* 'knee' as definitely reflecting *ō, but in fact Arm. *u* can also derive from *o before nasal plus consonant (Brugmann 1888:70), so that *cunr* does not necessarily derive from *ǵoAn-. As for the /k/, which appears in some of the declined forms of *cunr* as well as in MidPers. *zānūk* 'knee', I have too little expertise in these languages to comment on whether they might possibly represent a hardened laryngeal.

Further discussion of IE 'knee' words is unnecessary here; the interested reader may refer to Pokorny (1959:380–81), as well as to the sources cited above. Our main interest is in establishing the possibility that *ǵA/*gA may give /kh/ in Greek. *Prókhnu* is one piece of evidence in favor of such a conclusion, and while there are not too many other indications that this root should be reconstructed with the laryngeal *A, there seems to be no counter-evidence demanding a non laryngeal reconstruction. Tentatively, therefore, we can assume for 'knee' a root *ǵenAu-, seemingly identical in the proto-language to *ǵenAu- 'jaw', and subject to the same laryngeal metathesis that is evidenced by the attested words meaning 'jaw, etc.' But the postulated development *ǵA/gA > Gk. /kh/ requires more examples before we can place too much confidence in its validity.

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IV. LINGUISTIC PHILOSOPHY

REDEFINING LANGUAGE

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TRADITIONAL VIEWS of language recognize three major types: general human language, domain-specific language, and formal language. We would like to look at the definitions of language types, suggest fallacies in the traditional views, and propose new definitions of language types.

Much of this paper is based on a recent book by Alan Melby, entitled *The Possibility of Language*. In his book, Melby argues for a fundamental distinction between general human language and domain-specific language and claims that the importance of this distinction has been underestimated in the past.

General human language is very flexible, very creative, not limited to a particular domain, and is considered human language (+h). Domain-specific language is very controlled (in terms of vocabulary, meanings, and structure) and is considered human language (+h) but limited to a specific domain, such as metallurgy or air traffic control. Formal language is completely finite in vocabulary and structure and is not necessarily human language (-h). A computer programming language is an example of a formal language. Typically, it is used by machines and is restricted to a specific task.

Traditionally, general human language and domain-specific language have been grouped together:

General Domain **Formal**

Notice that there is no mention of LSP (Language for Special Purposes) because it is assumed to be in between general and domain-specific and fits in the box. Indeed some would argue that the distinction between generla and domain-specific language is much weaker than Melby claims. A few would go so far as to suggest that there is no distinction at all, that general language is nothing more than the strict sum of all domain specific language. This issue is worth pursuing and will hopefully be the topic of a future paper.

However, if we examine the characteristics of these three types of language, we notice that there is a logical inconsistency in this grouping. Domain-specific language has more in common with formal language than with general language (see Melby's *The Possibility of Language*). Formal language and domain-specific language can both be delimited, that is, exhaustively definied

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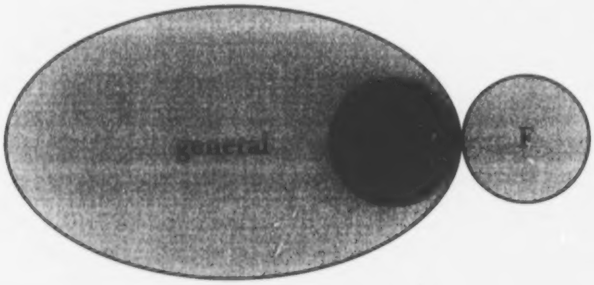
by a finite description; general language cannot. The only characteristic shared by general and domain-specific language is the +h characteristic. This makes the grouping very comfortable, as it allows us to group all humanly used languages together. It creates problems, however, as we shall see later, because of the assumptions about language and describing language created by this grouping. A Venn diagram describing the traditional view of language would look like this:

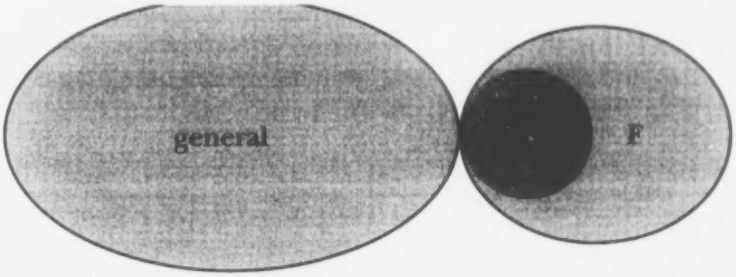


When we look closely at the characteristics of these types of language, we notice that this grouping is logically inconsistent. Domain-specific language is not a subset of general human language; it is a subset of formal language. This becomes obvious if one considers the huge number of domain-specific technical terms that are **not** part of general language. Purely domain-specific language is, however, a type of formal language; specifically, it is that subset of formal language which has the attribute +h, meaning it is considered to be human language. Domain-specific languages can be defined as formalized human language.

Once we have accepted this conclusion, we realize that we have redefined domain-specific language so as not to include it in general language:

General **Domain-specific Formal**

The Venn diagram for this new grouping would look like this:



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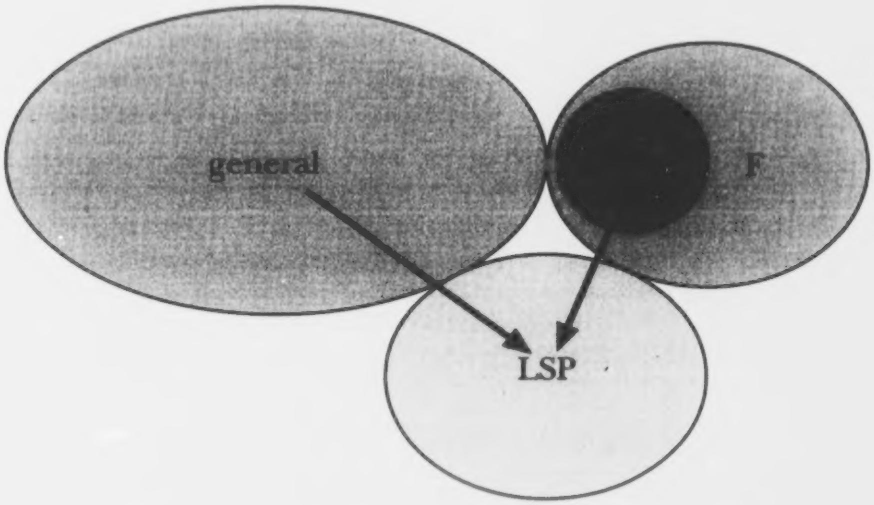
This grouping is logically consistent, based on our previous observations, but it makes us somehow uncomfortable. We wondered why this would make us uncomfortable, aside from the splitting up of the two +h categories. We realized, suddenly, that this scenario leaves no room for LSP, which makes up a great deal of language use, particularly texts. The reason there is no room for LSP is that LSP has been assumed to be a union (a mixture) of domain-specific language and general language. In the old scenario, there was no problem; it could be diagrammed as an area of overlap between general and domain-specific language. In the new diagram, there is no such overlap.

The new diagram shows that LSP is not a union of general language and domain-specific language. It is a compound of the two. Just as in chemistry a compound is not simply a mixture, so in language. LSP is not domain-specific language and LSP is not general language. It does, however, exhibit characteristics of both but is not a formal language. This demonstrates a deficiency of the current diagram. This deficiency makes the new diagram unsettling. There is no simple way to show the combination of general and domain-specific language without including formal language. In fact, any attempt to include any part of domain-specific language in such a diagram would by definition (the new definition) include formal language characteristics. This caused us to reexamine LSP in light of these new groupings.

We came to the conclusion that LSP constitutes a fourth, independent group which shares characteristics of both general and domain-specific language, but is a subset of neither and does not participate in the characteristics of formal language. The Venn diagram illustrating this idea looks like this:



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This diagram is accurate only if it is understood to describe LSP as a compound of general and domain-specific language.

What, then, is the significance of this regrouping? The point of all this is that language as described by formal approaches such as generative grammar falls into the domain-specific category. It is a controlled, limited language used by humans. As such, it is a subset of formal language and not a subset of general language. It may share more with LSP than with general language. If so, it is more likely to explain LSP than general language, and the closer LSP is to domain-specific language, the more likely it is that such formal approaches will explain LSP. Machine translation and other natural language processing systems are able to deal with some LSP texts because those systems are formal systems using formal languages, and the closer LSP approaches to domain-specific language (a subset of formal language), the more success natural language processing will have. This explains the partial success and partial failure of both formal approaches and natural language processing and suggests that neither will ever successfully completely explain general human language. There have been encouraging results for some LSP texts, but there have also been many discouraging results. The stubborn refusal of general language to yield to formal techniques is better explained by our redefined language type grouping than by the traditional view.

Note: The limitations of Venn diagrams make it impossible to accurately represent the relationships among the various categories of language as described in this paper using a Venn diagram. The diagrams are only an aid to help illustrate the proposed regrouping. A better way of illustrating these relationships needs to be found.

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'96 THESES

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I WAS RIDING the bus away from the university. Two students on the seat in front of me were discussing their boyfriends. One said something to the effect that hers was spending so much time in the computer lab she was afraid he would turn into a computer. The second interrupted, 'So, what's wrong with a computer?', to which the reply was

A computer I don't need. (spoken)

That reply was a bit of text. My major thesis is: (1) *Texts constitute the core subject matter of linguistics.* Note the restrictive modifier 'core'; I will come back to that.

This follows, more or less, from another thesis: (2) *The common, ordinary, observable manifestation of language consists of texts.* Well, maybe that is not a thesis so much as a start on a definition. A grammar (and the same thing goes for a phonology, etc.) is a description of text. To produce a grammar, the first step must be to assemble a corpus of texts. An initial corpus is usually obtained by elicitation.

I want to point out one feature of 'a computer I don't need' as a bit of text. It is of a sort not likely to be elicited unless known in advance to exist, and even then perhaps difficult to get. If English were an undescribed language and a linguist well trained in a tradition like that of North America were to arrive, recruit an informant, and start working, he or she might never elicit such a piece. The resulting dissertation, to be for years the definitive syntax of the language, would not mention the sort of object fronting exemplified.

Whether that particular instance will hold or not, I will stand on a comprehending thesis: (3) *Elicitation can never produce more than a severely limited, skewed corpus*; there are always important, even pivotal, patterns that are missed in elicitation and there may be artefacts. An elicited corpus may be a necessary expedient, but beyond preliminary analysis it should be considered nothing more than a helpful appendage to a corpus of observed rather than elicited text.

When I lived in New England, I occasionally drove through a suburb of Cambridge, and so encountered utility barricades on which was emblazoned:

DIG WE MUST FOR A BETTER BOSTON (written)

That, too, is a text, a complete, self-contained piece of text. A third fragment of a thesis: (4) *A proper corpus must contain an assortment of complete texts of various sizes.* Texts, moderate to long ones, are the places we find most of those unelicitable patterns.

Another thesis: (5) *Two kinds of texts, 'spoken' and 'written' are both equally valid parts of the core data.* That is, certain languages, English among them, have two kinds of texts, that differ fundamentally though perhaps not greatly in the matters we usually examine. A reasonably complete description of such a language demands attention to both.

Both the examples I have used so far I have cited in manuscripts other than than the one on the lectern before me. The first appeared as

(12) A computer I don't need. (written)

But, of course, it was no such thing. Except for Victor Borge and a few lesser imitators, no speaker ever uses periods or capitalizes initials. The relation between what I heard on the bus and what I cited in that MS is a complex one. I gratuitously made a spoken text into a written sentence.

A sentence in English is something that ends in a sentence punctuation and starts with a capital—leaving aside instances where one or both marks are neutralized out. I know of no other sensible definition of a sentence, so one of my minor theses: (6) *A sentence is a unit of certain written languages only,* say, English, not of spoken, making use of syntactic devices (e.g., punctuation) that have no spoken counterpart.

From both of my examples I could have abstracted clauses, a unit we can take to be common to speech and writing. Pardon the clumsy attempt to leave out the intonation which is not part of the clause, any more than the punctuation is.

a computer I don't need

dig we must for a better Boston

Or something like that. Just how we represent speech in writing and writing in speech, or some things that represents both in either medium, is a tricky matter—one that we linguists have in general not completely solved, which is one reason we have confused the two in spite of decades of strident insisting that 'only speech is language'.

One reason for my demanding that both spoken and written language must be examined for any adequate grammar is precisely that most of our linguistic publications have actually examined written language, thinking they were looking at speech. What after all is that famous example, the opening shot in the opening skirmish of of the Revolution?

1) Colorless green ideas sleep furiously. (written) *Syntactic structures*, p. 15

The clause is the highest level at which spoken and written language come reasonably close together. That is, where the citing of forms in writing in a discussion of speech or vice versa, or simply conflating the two, does least damage. Actually, minimal damage, not none.

I say that the sentence is a unit in written English. I deny that the sentence exists in normal speech. That is not to deny that there are units in spoken English 'larger' than the clause. There most emphatically are. But they correlate very loosely, if at all, with the larger units of written text and so it is undesirable to use the same terminology for both. That goes for 'paragraph' as well.

We have, most of us, learned not to speak of 'phonemes' of written English. For exactly the same reasons we ought to learn not to speak of 'sentences' and 'paragraphs' of spoken English.

What then is the 'S' beloved of modern syntacticians? It is best thought of as a German *Satz*, best translated 'clause' but also used in modern syntax of various kinds of clause clusters. That just may, in fact, be the etymology, not that that matters.

Which brings me to restatement: (4) *The core data of linguistics is a corpus of texts of any size, including those of moderate to large size, and fragments of texts of any size.* That is, by insisting that we must look at some long texts, I am emphatically denying the Bloomfieldian thesis that the 'sentence' is the upper limit of syntax, a thesis that has been explicitly or implicitly continued in Bloomfieldianism's successors.

I think I know one of the main sources of this notion. It is that the so-called 'sentence' is in general the largest thing that can be feasibly elicited. Traditionally, we start eliciting words, at first largely what we expect to be 'nouns', recording both what we hear and what we asked for. We work up to things like 'The cat is on the mat', which our elementary teachers taught us was a 'sentence', and there we stop.

Our record of what we asked for is a gloss, often believed, quite misleadingly, to be a meaning. I haven't yet figured out how to formulate what I want to say about glosses in the form of theses. There are too many terminological problems. For the ordinary garden-variety glosses as they appear in field notes I will give this in lieu of a thesis: *Field glosses should not be thought of as meanings.*

The Bloomfieldians had a long drawn-out debate about whether linguistic analysis should be done with or without appeal to 'meaning'. This was in fact a debate about the use of glosses, not of meaning. Glosses, in the instances at point, are elicitation prompts. If you are working with a typical elicited corpus, the answer must clearly be that you cannot use meaning, because you don't have meanings to use, only glosses.

Whether glosses are absolutely necessary for analysis or not is a tricky question. With a typical corpus of elicited words, phrases, and short sentences, they probably are essential, but not because of, but in spite of, the fact that they may give some very crude hints about meaning. Glosses don't need to even hint at meaning to be useful in analysis.

The week I drafted this I overheard a conversation in which it had been mentioned that fresh asparagus was 99¢ a pound at Furr's supermarket. To this came a rather long comment to the effect that the speaker liked asparagus, etc. In it I heard *asparagus are* and *them*, mutually checking indications that for this speaker *aspargus* is a plural noun. I was not able to record the whole text. But I did make a note about this feature. It went into my corpus as a very minor but interesting item. There was no gloss of the conventional type; I had not elicited and I could only guess what prompt might elicit.

Textual context served me as a gloss might—or rather better; for one thing it enabled me to see that *them* marked plurality in *asparagus*. I now know that for one ideolect, perhaps some dialect, *asparagus* is plural. Just as I know that for a dialect I used to speak *molasses* is plural, and for another I used to hear *cabbage* is plural. Very minor details, perhaps, but a language is largely a mass of details, most of them individually quite minor.

The point I want to make here is that discourse context can often serve where elicitation glosses are traditionally used—at least as well, and probably better. Glosses are necessary only because they are a poor substitute for something better, which the beginning field linguist is not yet able to use, and from the later use of which he or she has traditionally been excluded by an unnecessary and in fact disasterous assumption.

Moreover, it is possible to do semantics on discourse context, whereas glosses are semantically misleading to the point of being dangerous. Some day field linguists will get serious about semantics, but first we must get serious about text, particularly long texts. The kind of texts which, if we record them at all, we currently dismember before analysis, because syntax is 'the science of sentences' or something like that. In so doing we have destroyed an immense amount of data. Text—connected text—is where most of the semantics hides.

Some syntactic phenomena—intra-clause phenomena included—are only initially analyzable on the basis of larger-than-'sentence' textual context. My first example is a case. That usage, 'a computer I don't need', is only initially analyzable on the basis of data in the comment to which it was a reply, and to the bit of text which that interrupted. 'Dig we must for a better Boston' is not initially analyzable on its own, but only by analogy with other items which have a revealing context. Retrospectively, we can 'explain' it on the basis of non-linguistic context. But only retrospectively.

'Sentences' of this sort are, in fact, a favorite playground of 'sentence'-limited syntax. But that is only because somewhere back in the history of our discipline somebody 'cheated', that is, took a clue from a wider context and invented 'topic' or 'theme' or something of the kind to insert into the sentence to encapsulate a bit of something external to the sentence.

This is not the only instance where linguistics has advanced by surreptitiously or unconsciously transgressing declared operational axioms. Linguistics would never have come close to its present vigor if it had always adhered stricty to the rules it laid down for itself.

Linguistics is a very mixed federation of subdisciplines, and quite properly so. In recent practice, descriptive phonology and descriptive morphosyntax (and I wish I could add as equals descriptive lexicography, descritive semantics, and descriptive grammatology) divide the responsibility for describing languages. (7) *Compiling grammars (in the broadest meaning of 'grammar') is the 'core task' of linguistics.*

The word 'core' is chosen with care. It has, I hope, minimum implication of domination, superiority, or prestige (an apple core is the least prestigious part of the apple), and to the best of my ability I want to protect it from imputation of anything of the kind. It is simply a matter that descriptive linguistics has the most direct and most extensive access to the core data, corpora of texts. Within the discipline, its chief privilege and responsibility is to order that data (into grammars and lexica, etc.) for the use of other members of the federation, theoretical linguistics, historical linguistics, etc. Additionally, grammars and dictionaries should be among the major exports of linguistics, one of the ways we pay our debts to academia and society in general.

To discharge its responsibility as effectively and as fully as possible, descriptive linguistics must reorient itself to text, observed in natural use rather than elicited in an artificial context, written as well as spoken, and particularly, to long connected texts as well as short fragments. In doing so, it must lead the whole discipline to a wider view. As a minor step in that direction, we must all rethink the 'sentence' as merely a unit within possible larger units, not any sort of focus or limit of language.

PEIRCEAN ROOTS OF PRAGMATICS AND PRAGMATIC ROOTS OF THE HUMAN LANGUAGE FACULTY

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IN TEACHING PRAGMATICS to linguistics students, I have consistently encountered two problems.

First, the brighter students point out and sometimes even bitterly complain that they can't find the 'big picture' in pragmatic theories. In syntax, they say, it's clear that we're building sentences, in semantics we're building propositions, in morphology, words, in phonology, phonemes and syllables. 'But what are we building in pragmatics?' they ask.

'Social meaning', I reply.

'And what does that look like?' they ask. 'What's the big picture?'

I was for a long time at a loss for an answer. It's true enough that we don't always find clear and coherent links between Austin's seminal distinction (1962) between locutionary, illocutionary and perlocutionary force, Searle's felicity conditions (1969), Grice's conversational maxims (1975), Sperber and Wilson's reduction of a pragmatic inference to a single principle of relevance (1986), and Brown and Levinson's positive and negative face-saving devices (1987) that seem to work against the theoretical reduction pramatic principles to mere relevance. There is, of course, a similar lack of theoretical unity among linguists who study syntax, but each distinct syntactic model (generative grammar, cognitive grammar, dependency grammar, etc.) tends to present itself as a whole, internally coherent theoretical perspective that eliminates the need for other theories, whereas discussions of pragmatics tend to invoke the various competing pragmatic theories as if they might each contribute to some single broader perspective, its outlines as yet only dimly perceived (Turner 1995, 1996).

The second problem with students is that, despite the lack of theoretical unity, most of them find more appealing and accessible the kinds of language behavior studied under the heading of pragmatics. This is a problem because (a) successful linguistics students ultimately must be led from pragmatics to an equally deep appreciation for more the minute details of language studied under the headings of syntax, morphology, and phonology and because (b) there is absolutely nothing in the standard treatments of pragmatics that carries over to standard treatments of these 'deeper' more 'central' language.

faculties. Just as there is a lack of unity between the subtheories of pragmatics, there is a corresponding lack of apparent unity between pragmatic principles and principles thought to operate in other language 'modules' such as syntax. Functionalists will quickly point out that they *believe* that the formal properties of syntax, morphology, and phonology somehow directly reflect pragmatic (communicative, social) necessity, but that presumed connection has yet to be demonstrated to everyone's satisfaction, and it certainly has not been demonstrated in a fashion that can be easily explained to students.

In this short paper I cannot construct a complete solution to these two problems, but I propose to lay the foundations of a solution, to invite my audience to consider a broader perspective, to see less dimly, more clearly the outlines of the historically forgotten but still viable project which pragmatic theorists have gradually and mostly unknowingly reconstructed since Austin's initial work was published.

I propose to show that the overall picture of linguistic pragmatics emerging from Austin, Grice, Searle, Brown and Levinson, and Sperber and Wilson's thought re-creates key aspects of the original pragmatic philosophy of one Charles Sanders Peirce (1839–1914), who died in relative obscurity, a victim of his own abrasive personality and Victorian-era academic politics (Brent 1993). William James (1842–1910), a more politically astute student/colleague of Peirce, altered and popularized 'pragmatic philosophy' as a variety of positivistic behaviorism largely at odds with Peirce's conception but resonant with mechanistic philosophies widely accepted in the early 20th century (Arens 1994:12). However, PRAGMATICS emerged as a recognized component in linguistic theory only after a wide reading of J. L. Austin's *William James* Lectures at Harvard in 1955 (published in 1962 as *How to Do Things with Words*). By invoking mentalistic and not-positively-observable entities like illocutionary force and felicity conditions, Austin and Searle's pragmatics is at odds with the pragmatic theory of James and is in fact a partial reconstruction of Peircean pragmatics:

> Pragmatism is the principle that every theoretical judgment expressible in a sentence in the indicative mood is a form of thought whose only meaning, if it has any, lies in its tendency to enforce a corresponding practical maxim expressible as a conditional sentence having its apodosis in the imperative mood. [i.e., IF certain conditions hold, then DO X!]
> (C. S. Peirce, *Collected Papers*, Volume 5: paragraph 18)

More than a quibble about historical credit, this partial resurrection of Peirce's original thinking in speech-act theory has profound implications for linguistic theory generally. That is, if we move from a partial reconstruction to a full implementation of Peirce's thought, we come across Peirce's mathematical argument that successive iterations of his basic principles would create increasingly intricate formal structures, the details of which nevertheless share the basic shape of the pragmatic system as a whole. Peirce's pragmatic system has, in current terms, fractal geometry. Successive iterations of the pragmatic fractal generate structural complexities upon which the formal properties of a language's syntactic, morphological, and phonological properties typically condense in systems partly chaotic and idiosyncratic, partly universal and rule governed. These will constitute systems which are in a sense autonomous, but which nevertheless share among them in their details the same shape as the pragmatic system as a whole. Pragmatic theories are thus not peripheral to 'core' linguistic modules but are rather their foundation. More on this shortly.

I will first give an overview of Peirce's basic categories and then address each of these issues in turn: the relationship between his expanded categories and current pragmatic theories and then the relationship between pragmatic interpretive processes and other 'modules' (read as fractal subdomains) of the human language faculty.

THREE PEIRCEAN CATEGORIES: THE FIRST ITERATION. Peirce's semiotic thought is vast. Eight thick volumes of his writings have been published by Harvard University since the 1930s, and many of his manuscripts remain unpublished still. (Subsequent citations of Peirce's writing are to volume: paragraph numbers, e.g., 6:201) Yet, all Peirce's thinking comes down to the iteratively expanding dynamics of three universal categories. He claimed that everything we perceive and think about (i.e., represent to ourselves as feelings, images, reflexive action/reaction, or as language) contains mixtures of these:

FIRSTNESS defined thus: *Unanalyzed Qualities* of sensation, like color, warmth, sweetness, etc. These qualities are potentially but not necessarily realized in actual objects, as in a dream or hallucination. Beyond a biological nervous system, Firstness is exemplified by the potential energy of a boulder poised on a mountaintop that might at any moment roll down with a mighty crash, but has not yet done so.

SECONDNESS defined thus: *Action and Reaction*, or resistance to a quality of Firstness, like the shrinking away from pain, distaste or pleasure in reaction to a color or flavor. When the boulder actually begins to roll, and exhausts its potential energy by crashing against other rocks in the valley, potential Firstness has been converted to actual secondness. We are aware of a world of objects external to perceived sensations because of Secondness: we resist some of them in action, and some of them resist us in reaction—they are 'other', and 'otherness' is the essence of Secondness.

THIRDNESS fairly defies simple definition, is that condition which obtains mentally when we interpret both sensation (Firstness) and reaction to the 'other' (Second) and thereby create some *Representation* of objects: general *Categories*, physical *Laws*, rules of behavior, etc. As noted earlier Peirce generally construed Thirdness, the 'meaning' of an indicative sentence for example, as a tendency to enforce a conditional [IF qualities X obtain, THEN perform action Y]. So for example, when one approaches fire, the perception of it is a mix of Firstness, qualities of heat and dancing color, but also Secondness, reactive sensations of pleasure or discomfort, actions in relation to the fire as object, depending on whether one feels cold, or too warm already, but also finally Thirdness: one perceives that these particular sensations and reactions are of a general character—IF this has the qualities of 'fire' THEN EXPECT it to feel good on a cold day, to produce heat, to consume fuel and DON'T get too close or you can EXPECT to get burned! These conditionals are thus a characterization of the meaning (Thirdness) of the concept of 'fire' according to Peirce. Our sense of familiarity, regularity, habit and of a rule-governed future we can anticipate depends on Thirdness, the interpretation and representation of percepts as rule-governed objects. Thus, Thirdness synthesizes Firstness (percepts → conditional or potential perception statements) and Secondness (reactive objects → appropriate imperative reactions to object-perceptions).

It is critical to remember that Peircean Thirdness combines Firstness and Secondness but is not merely the sum of these; interpretation is not, as the positivists following William James thought, the mere listing of positively observable perceptions (firsts) and effects (seconds) associated with the use of a word. It is also critical to remember that Peirce understood Thirdness (interpretation, rules, and in effect, thought) to have manifestations outside human minds(figure 1).

As stated in the preceding quotes and illustrated in Figure 1, Peirce viewed the process of free potential genetic mutation (Firstness) and natural selection by the physical environment (Secondness) leading to biological evolution (Thirdness) as his primary model of extra-mental interpretation. By this model it becomes quite clear that Peirce viewed interpretations of symbolic forms as ongoing evolutionary processes, rather than as static physical entities.

That is, the free play of percepts and potential images triggered by any symbol in the mind is equivalent to multitudes of distinct potential organisms inherent in genetic recombination (all examples of Firstness). The manifestation of mutation in a single organism is like a specific 'guess' as to what a symbol might mean, also like a scientific hypothesis about the nature of reality. Poor guesses/hypotheses are quickly killed by active experiences/experiments (Secondness), just as white butterflies in a forest made black by industrial pollution are quickly spotted and eaten (falsified) by birds.

> Thought is not necessarily connected with a brain. It appears in the work of bees, of crystals, and throughout the purely physical world...
> Not only is thought in the organic world, but it develops there...
> In the evolution of science, guessing plays the same part that variations in reproduction take in the evolution of biological forms...
> When one reasons, it is that critical self that one is trying to persuade; and all thought whatsoever is a sign, and is mostly of the nature of language.
> —Charles Sanders Peirce, (*Collected Papers*, 4:551, 7:38, 5:421)

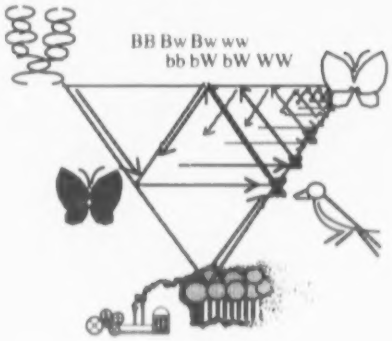

Figure 1

On the other hand, if the factory is shut down, and the soot blown off the white bark of the trees, then mutant white butterflies escape 'falsification' by eluding critical birds, publish their particular mutant interpretations in the gene pool, which begins to reinforce the white form across the species, a new form (paradigm) which will ultimately predominate in a white forest. For Peirce, this evolutionary process, the process of scientific theorizing, and the process of linguistic interpretation all exemplify a single natural class (Thirdness).

Consider an old riddle: 'What has four wheels and flies around?' In the closed linguistic environment of the question, interpretations of the words *flies* and *around* both tend to settle on images compatible with wheeled vehicles, having to do with motion, just as the dominant variety of butterfly in a black forest tends to settle on being black. This occurs despite the fact that the words *fly* and *around* potentially evoke other kinds of meanings besides those involving motion, just as the genetic code of one species of butterfly can and does produce white varieties as well. Context is the key: the answer to the riddle (a garbage truck) effectively kills off the 'circuitous flight' interpretation of 'flies around' just as it promotes by association the nominal and locative 'bugs nearby' interpretation of 'flies around', just as the removal of soot from trees ultimately extinguishes one variety of insect and promotes another. While many decry the ambiguity of words and sentences in natural language, in this model it (like genetic diversity) is the seedbed of linguistic (biological) adaptability. Words can and must be allowed variety and mutation in meaning to adapt to new environmental/cultural (i.e. pragmatic) situations, ultimately creating new words and grammatical patterns (like new species) in response to radical cultural change.

There is, however, one critical difference between evolutive processes in human language and biological evolution generally. Biological organisms,

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though generated by autonomous genetic codes, are ultimately shaped by physical environment. Human language, however, has effectively internalized and reflexively represented the evolutionary process internally as an expanding network of categorical relations. Because we now 'see' initial imagination and ultimate evolutionary outcome as categories of representation, we can plot a direct-line trajectory from one to the other (from the black to the white butterfly in Figure 1). Thus the evolutionary shaping process for humans now runs largely in the opposite direction: our physical environment is ultimately reshaped by our employment of language codes to reach an *intentional*, indeed a *teleological* outcome where effects can and do influence causes. Environmentalists will lobby for closure of a factory *because* they expressly intend to restore the white butterflies. As Austin and Searle (and Peirce before them) pointed out, language can be and is transformed into action, and the actions are driven by intentions, the represented path from idea to outcome.

SIX EXPANDED CATEGORIES AND LINGUISTIC PRAGMATICS: THE SECOND ITERATION. We move now to the hypothetical structure of that internalized evolutionary process as an expanding network of categories. Peirce's basic triad of categories expands indefinitely by the rule, $(N^2 + N) / 2$ where N is any whole integer greater than 1 (so, 3 categories →6→10→15→21→28 categories, etc.) I represent the 6-member system below (Figure 1, left) as an inverted pyramid following Peirce's convention (2:264). Peirce's 'Six Categories' (5:66–150) represent the second expansion (xx) of three universal categories: the PURE categories continue at the corners, and the next order of Degenerate categories occupy intermediate points. The term 'degenerate' is not meant perjoratively, but rather to detail 'generative' mixtures of pure categories: '12' (read as 'Firstness of Secondness'), '13' (read 'Firstness of Thirdness'), and '23' (read 'Secondness of Thirdness'). Here I am indebted to John Robertson (1994) for his elegant coordinate-system approach to Peirce's expanded categories.

In this section, I will describe the apparent isomorphism between Peirce's original description of pragmatic interpretation (left) and the currently accepted modalities of linguistic pragmatics (right). This isomorphism is diagrammed in Figure 2.

The fundamental logic Peirce used to expand his system is this: Firsts, (sign-quality → utterance) being monadic, do not subdivide. Seconds subdivide into a subordinate pair (in Peirce's alternate terms, *object* [22] and *immediate object* [12] → actual speech act and illocutionary [intended] speech act), Thirds subdivide into a subordinate triad (in other terms, *immediate* [13], *dynamic* [23], and *final interpretant* [33] → locution, perlocution, and felicity

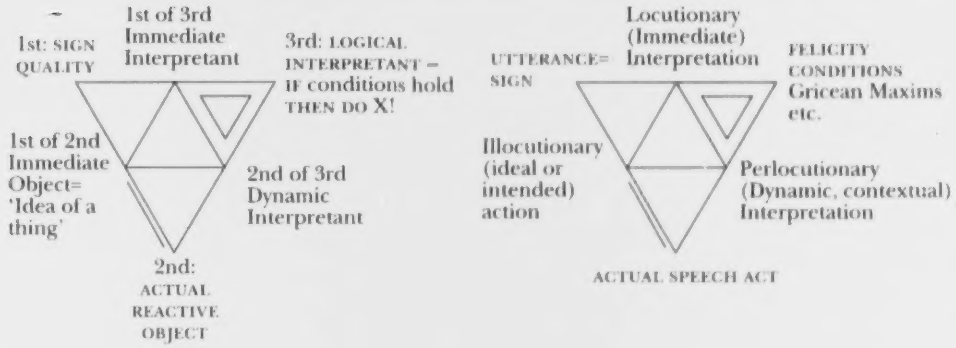
1st: SIGN QUALITY
1st of 3rd Immediate Interpretant
3rd: LOGICAL INTERPRETANT – IF conditions hold THEN DO X!
1st of 2nd Immediate Object= 'Idea of a thing'
2nd of 3rd Dynamic Interpretant
2nd: ACTUAL REACTIVE OBJECT
UTTERANCE= SIGN
Locutionary (Immediate) Interpretation
FELICITY CONDITIONS Gricean Maxims etc.
Illocutionary (ideal or intended) action
Perlocutionary (Dynamic, contextual) Interpretation
ACTUAL SPEECH ACT

Figure 2.

conditions). Peirce maintained this expansion logic as a matter of mathematical necessity:

> (1:530) But now I wish to call your attention to a kind of distinction which... arises from the circumstance that where you have a triplet you have three pairs; and where you have a pair, you have two units. Thus, Secondness is an essential part of Thirdness though not of Firstness, and Firstness is an essential element of both Secondness and Thirdness. Hence there is such a thing as the Firstness of Secondness and such a thing as the Firstness of Thirdness; and there is such a thing as the Secondness of Thirdness. But there is no Secondness of pure Firstness and no Thirdness of pure Firstness or Secondness.

Robertson (personal communication) first suggested to me that the key elements of Austin and Searle's conceptions of Speech Act theory might map on to a Peircean six-grid in the following fashion, where there is a kind of cyclical rotation (clockwise in Figure 2), representing the previously discussed linguistic path from idea to outcome, moving from the original intent of the speaker, to the actual speech act which is accomplished.

Illocutionary force: the intent behind an utterance or in other words what Peirce would called the potential 'idea' or 'image' of an actual action or object represented, i.e., First of Secondness.

Locution: the physical utterance, the sign itself, the First mode of Firstness as Peirce described it, that form which is directly perceived by the sign-user and has some potential meaning.

Locutionary force: the raw semantic structure behind the sign, its 'sense', its immediate interpretation, without reflection on possible social-contextual nuances or consequences. This Peirce described as the First mode of Thirdness (5:300, 8:184).

Felicity conditions and other assumptions generally held in a speech community (Gricean maxims, politeness principles, plus idiosyncratic aspects of social knowledge): These provide the linking logic, Peirce's construal of ultimate meaning as a set of conditional rules (as discussed earlier) which provide the basis for any pragmatic inference. This Peirce described as the Third mode of Thirdness, the logical interpretant.

Perlocutionary force: the actual interpretation of the utterance, the effect of it on a mind following the logic of the Felicity Conditions, etc. Peirce classifies this as the dynamic interpretant.

The Speech Act: The final material result, the concrete effect the utterance has on speaker and hearer. (Peirce's Second of Secondness). Usually the hearer begins the cycle anew with a reply, an utterance which has an intent behind it and so on. (8:315).

For Peirce, such a process of interpretation is a form of logical reasoning, minimally describable as a kind of three-line syllogism. However, the argument need not be deductive, the conclusion absolutely certain in order to be counted as a pragmatically legitimate inference under proper circumstances (5:276)—

1) This bean is white. 2) If any bean is from that bag then it is white. 3) This bean is from that bag.

That is, a normally intelligent person, seeing or being told that white beans were found on the living room floor will likely act to check the bean-bag chair (known to be full of white beans) for a hole. The deductive possibility that the beans came from elsewhere will not even be considered unless the bag is found hole-free. The above illustrates a kind of inference Peirce called abduction or hypothetical inference, based fundamentally on analogy (this white bean is *like* all the white bag-beans, so it may *be* a bag-bean too). It is arguably the most common kind of human reasoning and underlies most of what modern linguists call pragmatic inference. To adapt an example from Smith (1990:73), if some stranger comes up to you on the street and says—

4) *Nouakchott is the Capital of Mauretania*
—you are likely to think the speaker mad, but if Bill comes up to his friend Charlie and utters (4) above, and both men share the common assumption with that
5) *When Charlie plans a vacation, he always visits some capital city.*
—then Bill can reasonably expect and intend Charlie to interpret his utterance (4) to mean
6) *Charlie will want to make plans to visit Nouakchott.*
—With the final result that Bill has gotten Charlie to act: Charlie packs his bags for Nouakchott.

The path of inference from (4), the actual utterance or locutionary act) through (5), the conditional statement, to (6) (the perlocutionary conclusion and final action resulting) replicates the path in Peirce's example of abduction, (1) to (2) to (3). Thus both Smith's example of pragmatic inference and Peirce's example are abductive inferences, by no means certain, but certainly reasonable conclusions in a natural language context. Both examples follow the pragmatic path from linguistic statement whose direct interpretation concerns a perceived situation (first→first of third) to general conditional assumption (third of third) to conclusion (second of third), followed by action on the part of the hearer (second of second), action which a speaker might have imagined and intended from the beginning (first of second).

Recall that the first problem posed in this paper was the lack of apparent unity among pragmatic theories. That is, Austin and Searle's initial characterization of illocutionary force, perlocutionary effects, followed by Searle's discussion of preparatory, essential, sincerity and propositional felicity conditions, have not previously been systematically connected to Grice's maxims of quantity, quality, relation, and manner, Sperber and Wilson's attempts to subsume all these under relevance, and the apparently distinct face-saving strategies proposed by Brown and Levinson.

Under a Peircean analysis the possibility of a unified system emerges. Austin and Searle's categories constitute the basic six-grid system of pragmatic interpretation (Figure 2), while Searle's felicity conditions, Grice's Maxims (or Sperber and Wilson's one maxim) and Brown and Levinson's politeness principles *all* meet Peirce's definition of logical interpretants (position '33' on the six-grid). That is, all of these conditions can be paraphrased as IF X then DO Y or EXPECT Z according to Peirce's formula.

Searle: IF a speaker PROMISES Act A then EXPECT the hearer to prefer Act A being performed to Act A not being performed. (i.e., a definitive preparatory condition on promising. Failing this, the 'promise' is really a threat.)

Grice/Sperber and Wilson: IF engaged in CONVERSATION then BE RELEVANT, (and/or BE HONEST, BE CLEAR, BE COMPLETE but CONCISE (e.g., obey maxims of relevance, quality, manner, and quantity).

Brown and Levinson: IF giving directives to someone with greater or equal SOCIAL POWER then PROTECT your own social image (positive face) and AVOID directly threatening the more powerful someone's sense of their power to act (negative face).

If not for constraints of length in this presentation I should like to more fully discuss how all these various logical interpetive conditions might further relate to one another in another Peircean six-grid expanded from and parallel to the basic grid of pragmatic interpretation, as shown in Figure 2. In brief,

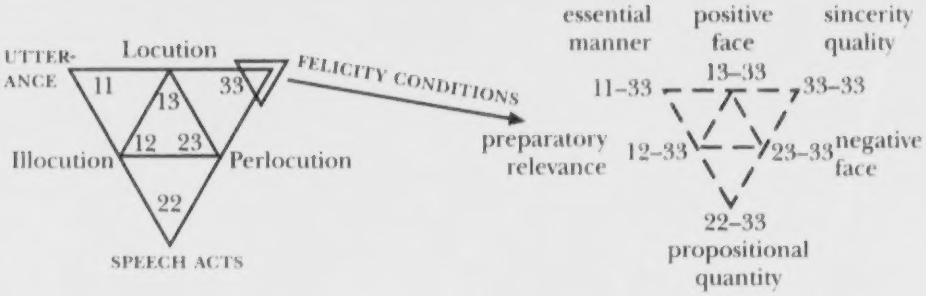
UTTER-ANCE
Locution
11
13
33
12
23
Illocution
Perlocution
22
SPEECH ACTS
FELICITY CONDITIONS
essential manner
positive face
sincerity quality
11–33
13–33
33–33
preparatory relevance
12–33
23–33
negative face
22–33
propositional quantity

Figure 3

within this specific domain of 'felicity conditions' (33) the Gricean Manner maxim and Searle's essential condition both show relatively greater concern the Peircean category of Firstness, the formal perceptual criteria that any potential speech act must meet (11–33). Relative to these, the maxim of Quantity and the propositional condition both specify what things must be referred to in a felicitous act (thus emphasizing Peircean secondness = object reference = 22–33). Following Sperber and Wilson, Relevance synthesizes at least the maxims of Quantity and Manner (thus = 12–33) and is also primarily concerned with speaker and hearer belief (preparatory conditions). Positive face, negative face, and the sincerity/Quality condition, I would argue, represent first, second, and third modes of more complex social-interaction conditions (i.e., Thirdness), but all these claims would obviously require further, extensive argument.

In this preliminary discussion, I shall indicate this much as an intriguing possibility, and move on to the relationship between that basic six-grid of pragmatic interpretation (Figure 2 right, Figure 3 left) and the larger issue, the second problem posed in the introduction, the relationship between pragmatics and other 'modules' of language and communication.

PRAGMATIC PRINCIPLES, NONLINGUISTIC COMMUNICATION AND 'CORE' LANGUAGE MODULES: THE THIRD ITERATION (AND BEYOND). In the vast bulk of his writings, Peirce deals only with various kinds of three, six, and ten-category relations, but he was very much aware of the potential to expand the size of his classificatory system indefinitely.

> (8:343) ...A sign, therefore, has a triadic relation to its Object and to its Interpretant. But it is necessary to distinguish the Immediate Object, or the Object as the Sign represents it, from the Dynamical Object, or really efficient but not immediately present Object. It is likewise requisite to distinguish the Immediate Interpretant, i.e., the Interpretant represented or signified in the Sign, from the Dynamic Interpretant, or effect actually

> produced on the mind by the Sign; and both of these from the Normal [logical] Interpretant, or effect that would be produced on the mind by the Sign after sufficient development of thought. On these considerations I base a recognition of ten respects in which Signs may be divided. I do not say that these divisions are enough. But since every one of them turns out to be a trichotomy, it follows that in order to decide what classes of signs result from them, I have 3-to-the-tenth power, or 59049, difficult questions to carefully consider; and therefore I will not undertake to carry my systematical division of signs any further, but will leave that for future explorers.

In my presentation of Peirce's Ten Classes of Sign (Figure 4 below) I have deliberately eliminated much of his terminology (2:254–63) for initial clarity's sake. For example, for what Peirce called an 'Iconic Legisign', I use the more familiar term DIAGRAM, which is a kind of sign emblematic of this class (2:258). In the expansion from the previous, six-place system (Figure 4, left), three more categories are added, one to each side of the pyramid, but a fourth, labeled DEMONSTRATIVE(123) also appears in the center of the system as a logical expansion of the six-grid's 23 node (since all 2x categories become 12x and 22x; all 3x categories become 13x, 23x, and 33x). The top left subtriangle (all coordinates 11x) is just that group of signs designated as ICONIC; the top right subtriangle, (all coordinates x33) is just that group of signs called SYMBOLIC; finally, the bottom sub-triangle plus demonstratives (all coordinates x2x) is that group of signs called INDEXICAL, which somehow became Peirce's most famous division of sign types.

There are volumes to be spoken about Peirce's Ten Classes, but I will restrict myself to three observations. First, the pragmatic path of inference dis-

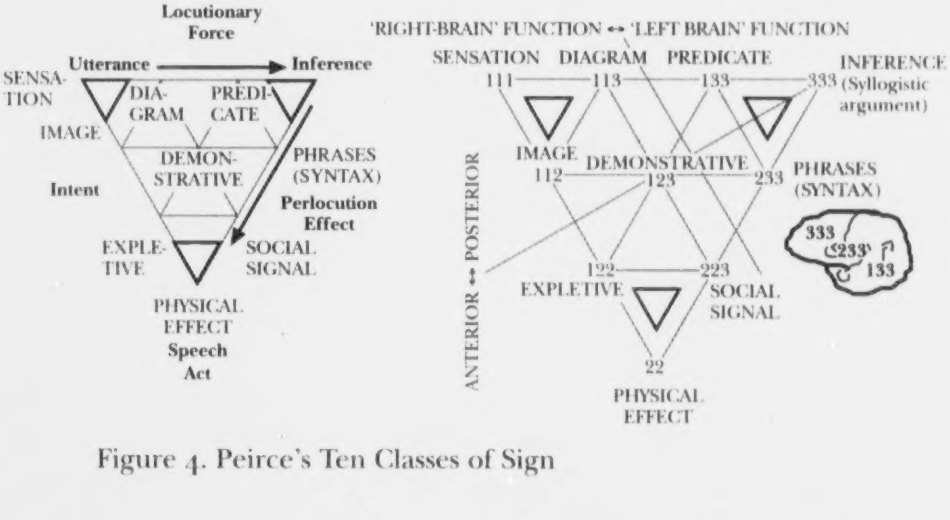
Locutionary Force
Utterance
Inference
SENSA-TION
DIA-GRAM
PREDI-CATE
IMAGE
DEMON-STRATIVE
PHRASES (SYNTAX)
Intent
Perlocution Effect
EXPLE-TIVE
SOCIAL SIGNAL
PHYSICAL EFFECT
Speech Act
'RIGHT-BRAIN' FUNCTION ↔ 'LEFT BRAIN' FUNCTION
SENSATION
DIAGRAM
PREDICATE
INFERENCE (Syllogistic argument)
111
113
133
333
IMAGE
112
DEMONSTRATIVE
123
233
PHRASES (SYNTAX)
ANTERIOR ↔ POSTERIOR
122
223
EXPLETIVE
SOCIAL SIGNAL
22
PHYSICAL EFFECT
333
233
133

Figure 4. Peirce's Ten Classes of Sign

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cussed previously is conserved and made more detailed (Figure 4, left). Second, though Peirce never commented on brain anatomy and seemed unaware of Broca's and Wernicke's (then recent) studies, his ten-class diagram turns out a fair representation of the distribution of signal-interpretation function in people with 'normal' left-right hemisphere and anterior-posterior lobe specialization (Figure 4, right). Third, these two observations together neatly explain how persons with significant damage to 'core' linguistic functions, the ability to correctly interpret or articulate lexical items, and/or syntactic structures, still are able to use some language pragmatically, as a system of social signals (Smith 1990:167–77). Most patients with left-hemispheric damage, for example, are still able to curse eloquently (i.e., utter EXPLETIVES—122 in the system). The path of pragmatic interpretation moves through the raw sensation of the utterance (111) to the construction of some kind of diagram of its meaning (113, Peirce here anticipating all the recent work of cognitive grammarians, e.g., Langacker 1993). From thence the interpretation is passed to 'left hemispheric' functions. Even in the absence of specific lexical and syntactic analysis, the language impaired patient may still have sufficient frontal-lobe capacity to draw inferences (333) and direct appropriate social behavior (223 and 222). Conversely, the Peircean model predicts/explains how patients with right hemispheric damage may retain basic linguistic competence but lose all sense of pragmatically appropriate language, as well as the diagrammatic nuances of lexical interpretation (Parker & Riley 1994:285).

To summarize to this point, Firstness, Secondness, and Thirdness subsequently expand into a system of six categories of sign, which expands into ten categories of sign. This sequence of expansion and elaboration of sign-classes can, in principle, be continued indefinitely: 3→6→10→15→21... and so on to any system of $(n^2 + n) / 2$ categories, where n is any whole number.

As illustrated in Figure 5, Peirce's recursive process of category expansion exactly parallels the means by which computer simulations create surface fractals of increasing detail and definition. Just as fractals are used to model physical terrain, I suggest that a Peircean category system expanded to the Nth degree would provide an increasingly detailed model of our psychological

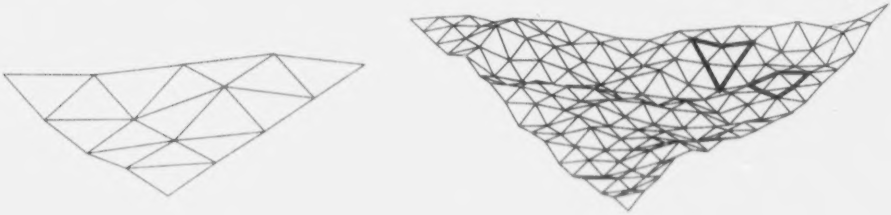

Figure 5.

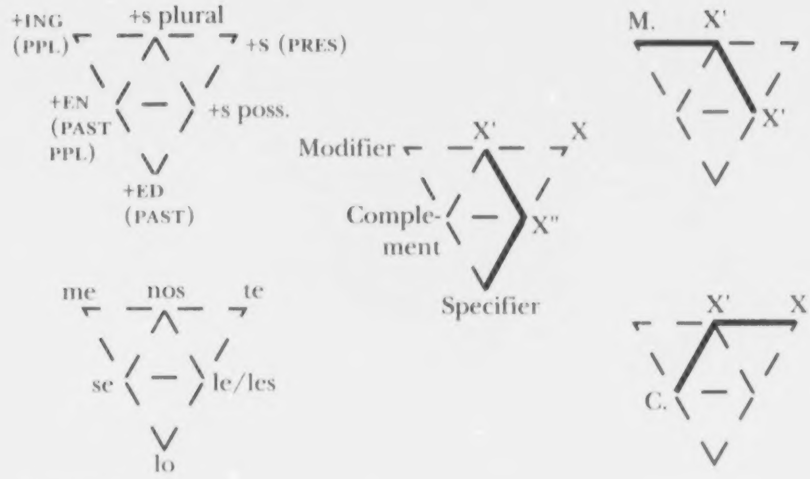

Figure 6.

landscape, the meaningful symbols contained there with their various relationships.

I would further suggest that, just as fractal details always replicate the pattern of the fractal whole, details of the Peircean terrain follow the pattern of the Peircean system as a whole. In other words we should expect to find countless sign subsystems that mimic Peirce's fundamental Six-category system and Ten category system. Therefore, we should expect 'core' linguistic systems such as syntax and morphology to be isomorphic with foundational pragmatic processes in Peircean terms, since all these kinds of meaningful products reside in one and the same mental landscape of human beings. Figure 6 shows some of the recent proposals of Robertson (1994, top left six-grid), Robertson and Turley (forthcoming, lower left grid), and Manning (1996, center and right grids). All these articles explore this possibility, utilizing Peirce's six-class framework as a descriptive and explanatory tool in looking at language patterns across languages.

CONCLUSION. Most linguists know of Peirce's three primitive categories as they are manifest in his subsequent, more famous distinction between *icon, index*, and *symbol.* These terms designate three distinct (but *not* mutually exclusive) methods of relating a representation (sign) to its referent (object):

> (2:293) A Symbol is a law, or regularity of the indefinite future [Thirdness]... But a law necessarily governs, or 'is embodied in' individuals, and prescribes some of their qualities. Consequently, a constituent of a Symbol may be an Index, and a constituent may be an Icon. A man walking with a child points his arm up into the air and says, 'There is a

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> balloon'. The pointing arm is an essential part of the symbol without which the latter would convey no information. But if the child asks, 'What is a balloon?' and the man replies, 'It is something like a great big soap bubble', he makes the image a part of the symbol. Thus, while the complete object of a symbol, that is to say, its meaning, is of the nature of a law [thirdness], it must denote an individual [Secondness], and must signify a character [Firstness].

With statements like the above, Peirce maintained that, to have general meaning, a symbol (third) had to evoke in the symbol-user the sense of an icon representing potential qualities (first) and in order to have a definite meaning, that icon-generating symbol must be used in conjunction with an index, or index-generating symbol representing an object (second). Now, signing chimps and African grey parrots are arguably capable of this much semiosis. By uttering *cracker* or *want cracker* (symbol) and by inclining or directing an appendage (index) in the direction of the object correctly perceived as having the quality of unleavened bread (icon), even animals may make use of the basic triad of icon, index, and symbol to perform 'speech acts' (i.e., DEMAND the food). One key feature that sets human language apart is syntax, our ability to recursively concatenate and hierarchically structure a series of index- and icon-generating symbols, but humans are also unique in the subtlety of our speech acts, our unbounded ability to create subtle shades of social meaning beyond straightforward signalling unambiguously directed at acquiring food, avoiding predators, or activating mating behavior:

> *I've heard that the oysters they serve here are delicious; perhaps you'd like to try some tonight.*

I'm ever mindful of an observation Chomsky once made in a guest lecture at Louisiana State, where I did my graduate work: human language is not just an elaboration of sociable animal communication, just as to fly is not just to jump a whopping great distance. We must grant that the bernoulli principle of flight invokes complex fluid mechanics and thus differs from simple ballistics. And yet, to challenge Chomsky's approach to language as a hermetically sealed system, any engineer worth his degree must be prepared to describe both flying and jumping in the single framework of Newtonian mechanics, with a common vocabulary of velocities, particle reactions, and trajectories. What has been lacking in linguistics is a single framework to specify BOTH the similarities AND the differences between functional communication in general and pragmatic interpretation as a particular, uniquely human capacity, between pragmatic interpretation and syntactic structure as a particular instantiation of that capacity. Peirce's semiotic supplies that lack, with a common vocabulary of Firstness (→ icons), Secondness (→ indices), and Thirdness (→ symbols) combined with a capacity to distinguish levels of complexity. The icon-index-symbol triad must be expanded to a second level to account for human pragmatic inference, to a third level and beyond to accurately place pragmatic inference in relation to animal communication on one hand and the subtle details of morphological and syntactic structure on the other.

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EXPLORATIONS IN HUMAN LINGUISTICS ANALYSIS: AN ALZHEIMER'S STUDY

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1. ASSUMPTIONS. I want to start by expressing my agreement with many of the previous speakers who, from Brian MacWhinney on, have rejected various published assumptions. These speakers are to be congratulated. It moves our science forward to question our assumptions and reject any that do not stand up. In a science it is appropriate that we question all our assumptions. Our discipline of late has in fact been characterized by the rejection of assumptions and a continuing search for acceptable assumptions.

Where are we to find assumptions that will not in turn have to be rejected? Are there any assumptions that will stand up? Yes, there are four assumptions we can accept—the four fundamental assumptions of standard science. All the rest need to be rejected and we need to search no further beyond these four, which are

(1) There actually is a real world out there to be studied—a physical reality separate from and independent of the scientists studying it—it's not just an illusion.

(2) The real world is coherent so we have a chance of finding out something about it.

(3) As scientists we can reach valid conclusions by reasoning from valid premises—we can calculate predictions from our theories for comparison with the real world.

(4) Observed effects flow from real-world causes—this is the assumption on the basis of which we test our hypotheses and theories about the real world against observations of the real world.

Can we really build a linguistics on this spare set of only four assumptions while rejecting all others—from Bloomfield's assumption to Chomsky's latest 12 or 20 and any and all others? Yes, we can. And if we can, linguistics joins the hard sciences, moving completely away from the soft sciences and the explication of intuitive concepts that is endemic there and which is philosophical, not scientific.

But there is no way I can tell you in a few minutes how it can be done. That is the task of my new textbook (Yngve 1996) to appear in December and first announced here at this meeting. I can, however, present a simple example and explain a few points along the way. This example is actually the first published attempt at analyzing real data by building on the new foundations.[1]

2. ALZHEIMER'S DISEASE. I have been working with a group under my co-author, Dr. Daniel Brauner, on the communicative problems of patients diagnosed as probable Alzheimer's disease.[2] We are looking at whether it is possible to obtain informed consent from mentally impaired patients or if we must fall back on approved procedures of consultation with a proxy.

Alzheimer's disease (AD), which was first described by the German neurologist Alois Alzheimer in 1907, is a condition which results in a gradual global deterioration of intellectual abilities, especially memory and ability to learn, difficulty in maintaining attention and orientation, loss of reasoning capacity, changes in personality, and differential linguistic impairment (Hamilton 1994). In the absence of a brain biopsy, the diagnosis of Alzheimer's disease is always a presumptive one based on clinical course and the ruling out of other causes of dementia. An estimated 4 million people in the U.S. alone currently suffer with this condition, and with the graying of society this number is expected to increase greatly over the next 20 years.

Despite the fact that linguistic deficits are a hallmark of AD and were noted in the first patient described by Alzheimer, until recently there has been little attention paid to the effects of dementia on linguistic ability. Bourgeois (1991) noted a 'conspicuous void' in the literature on maintaining communicative function in older people with degenerative neurological disorders. The vast bulk of the literature that does exist focuses on characterizing the deficits of people with AD. This work has described problems dubbed *anomia* (word finding difficulty), *palilalia* (repetition of a single syllable), perseveration of single phrases, *aposiopesis* (abrupt termination of an utterance that leaves a thought incomplete), lack of conciseness, less semantic cohesion, and reduced numbers of exemplars from a given category (Butters et al. 1987; Hier, Hagenlocker, & Shindler 1985; Ripich & Terrell 1988; Bowles, Obler, & Albert 1987; Price et al. 1993). Bohling (1991) studied the discourse of people with AD using Goffman's theory of frame analysis, which states that conversations occur within frames of meaning that shift frequently in the course of a conversation according to agreed upon social understanding. She found that conversations with patients with AD differ in that they may communicate from different frameworks than are expected, providing fewer cues to the listener.

Communication with people with Alzheimer's disease can often be frustrating since it may seem that their language is vague and empty. However, they may still be able to communicate preferences and values, especially in the earlier stages of the disease. Assessing their capacity to consent to treatment or experimentation poses special problems. At present there is no gold standard for evaluating the capacity of such patients to give informed consent or to make decisions. Experts in geriatrics and ethics have in the past evaluated the informed consent conversation using a gestalt based on their impressions, which are usually not explicit. A more careful analysis that focuses on the Alzheimer's patients themselves and how they interact with others conversationally holds the potential for assessing in a scientifically acceptable way their competency to give informed consent.

3. THE STUDY. Our procedure was to solicit patients, in consultation with their caregivers, to be videotaped in a conversation of up to an hour with the doctor. We used two cameras and a split-screen setup so that the patient and the doctor, seated nearly facing each other, could be seen side-by-side on the playback screen in frontal view from below the knees up as in Figure 1, which shows the patient BT. Gestures and facial expressions were easily observable and timing to $^{1}/_{30}$ second was possible.[3]

Figure 1. Patient BT and the doctor

Patient number 4, BT, the subject used for this study, was an 88-year-old woman with multiple medical problems including blindness and probable Alzheimer's disease. She scored a 15 out of 29 on the Folstein meaning mental status exam, which would place her in the mild to moderate category of the disease.

The subject, accompanied by her caregiver, was met at the hospital entrance by the doctor and brought in a wheelchair to the videotaping lab. There the doctor helped her out of the wheelchair and helped her out of her jacket and vest and then to her chair. He then clipped a lapel microphone on her and explained briefly that they would have a conversation about her life story and later about her medical problems. She responded appropriately with *m-hmm*, *OK*, and the like. He then asked her whether she minded if we showed the tape to others and got her signature on the consent form.

Preliminary analysis revealed that the patient responded to the doctor with *m-hmm*, or *un-hunh* 16 times or about one-third of 49 conversational turns. In the face of this large proportion of laconic responses, there is a question of whether she really understood or simply responded automatically with an appropriate turn-change signal. There is thus a question of whether she had really given her informed consent.

The first 6 $^1/_2$ minutes of this tape has been subjected to further analysis building on only the four assumptions of standard science in the manner laid out in detail in the new textbook.

4. SYSTEMS AND PROPERTIES. From assumptions (1) and (2) above that there is a real world out there, and that the world is coherent, we focus our analysis on the real-world persons, that is, on the patient, her caregiver, and the doctor, taken both individually and as a small group of three people. Our analysis can also handle the sound energy of speech and the light energy of the visual channel and also tactile energy as the doctor helps the patient. Our analysis can also take into account the wheelchair, the cameras and microphones, the videotaping lab and, of course, the patient's outer garments, which are removed.

We analyze the people and other real objects in terms of physical systems and postulated properties, as is the practice in standard science. We do not need to assume language or the objects of language or grammar or lexicon, nor do we need to assume some entity like a conversation or a discourse to which the doctor and the patient are assumed to contribute. We study people, not language, and we study them through science, not through grammar.

The system representing the group of three people is a linkage described in terms of linkage properties that are answerable to observations of the real group. The systems representing the three persons individually are communicating individuals, described in terms of linguistic properties answerable to observations of the corresponding individual persons.

Our justification for analyzing real-world objects and people in terms of properties in this way is the existence of three empirically supported general laws introduced in the textbook and also previously published.

When communicative behavior takes place there are associated changes in the properties of the individuals and linkages involved. We postulate particular properties and their changes on the basis of assumptions (3) and (4) that we can reach valid conclusions from valid premises and that observed effects flow from real-world causes.

A linkage is also analyzed in terms of functional parts and their arrangement. In this analysis these functional parts are the role parts for the patient, the caregiver, and the doctor. To be complete we could also set up functional parts for the physical sound waves and the other real objects figuring in the assemblage. Functional parts are also analyzed in terms of properties.

At a lower level the form that fills a role-part function is a participant, also described in terms of properties. The properties of a participant form a subset of the properties of the corresponding communicating individual. They are just those properties of the individual that are required to account for that individual's participating in the linkage by filling one of the functional parts.

The theory can also recognize channels, props, and settings, which, together with the participants, are the constituents of the linkage. In a more complete analysis we would also have channels for sound, vision, and tactile energy, props for the wheelchair, chairs, microphones, etc., and a setting for the videotaping laboratory. At the role-part level we would have corresponding channel parts, prop parts, and a setting part.

We could then replace the conventionalized printed transcript representing the sound channel by an analysis of the acoustic energy of the sound of the voices of the participants. This would build on existing articulatory and acoustic phonetics and psychophysics in well-understood scientifically acceptable ways. However, the theory would need further development in the area corresponding to phonology. One of the advantages of taping the interview is that the sound is available for instrumental analysis if desired. With a videotape record we can also take into account gestures and facial expressions in the visual channel if we wish. Although much has been done in the area of nonverbal communication that might be of help, we would probably also require further development of appropriate theory here as well.

This architecture of theory can be diagrammed conventionally in a way somewhat reminiscent of structural linguistics, as in Figure 2. Here L is the linkage representing the three-person group. On the second line are the patient, caregiver, and doctor role parts. On the third line are the corresponding participants, BT as patient, Ms. X as caregiver, and DB as doctor. There is a form-function relation between the participants and the corresponding role parts and a part-whole relation between the role parts and the linkage.

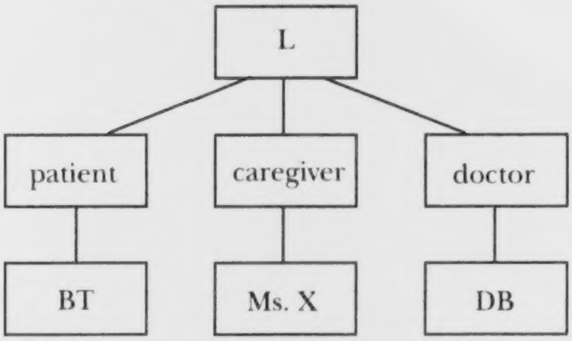

Figure 2. The linkage system (top), the role part systems (center) and the participant systems (bottom)

The properties of the individuals and participants are answerable to observations of the real persons individually whereas the properties of linkages and their role parts are answerable to observations of real groups. In this way the theory analyzes the relation of individual phenomena to group phenomena and thus bridges between the individual psychological level and the social level.

AD is a condition caused by disease-related changes in the neurological or biochemical properties of the patient. Related to these underlying biological properties are functional properties responsible for the observed normal and abnormal behavior of the person. The relation of the functional properties of the person to the lower-level biological properties is a relation of scientific reduction well understood in science.

The changes in the functional properties of a patient enter our analysis at the participant level, since the participant properties are ultimately a subset of the functional properties of the person. In communicative disorders these changes show up in communicative function at the linkage level.

Thus we have scientifically justified theory reaching all the way from the neurological and biochemical changes of AD at the biological level up to the concomitant changes in communicative function in a group at the social level.

5. ANALYSIS. Our analysis makes use of a scientifically justified notation for properties and their changes. The changes in properties are represented as the result of the execution of procedures, and the procedures are also properties. They are actually specific dynamic causal laws of communicative behavior and they can be tested by the standard methods of science.

The notation allows for the representation of tasks and subtasks and their execution, both linguistic tasks and the nonlinguistic tasks they coordinate. As an example, at one point we have:

Doctor: I'm gonna take your jacket off. Is that all right?
Patient: OK.
Doctor: OK. [he removes the jacket] ...

Here we have at the linkage level a cooperative nonlinguistic task of removing the patient's jacket that is coordinated by linguistic tasks. The doctor asks if it is OK to take her jacket off, and at her reply of OK he removes the jacket. The removal of the jacket thus also has communicative significance as part of his reply to her OK as giving assent.

Note that it is the changes in properties that represent understanding, and thus understanding is context dependent since changes in properties are relative to their current values. Thus at the participant level when the doctor says 'I'm gonna take your jacket off. Is that all right?' there are changes in his properties representing his understanding of what he has asked her. Then when she says OK he understands it as her answer giving her assent to his taking the jacket off, not any other possible significance of OK in a different context. And when the patient hears the doctor say this, and if she has understood it, her properties change to represent her understanding. It is then in this context that she says OK as giving her assent.

She probably does understand and actually does give assent, for when the doctor proceeds and takes the jacket off, she does not protest. This conclusion is supported by the next exchange in which she does in fact protest:

Doctor: OK. [he removes the jacket] Maybe this vest, too; it's really pretty warm in here.
Caregiver: Right.
Patient: You takin' my vest off? I can keep that on.

We can conclude that the OK is probably not just an automatic empty turn change signal as one might suspect but genuine consent and it indicates understanding on the part of the patient.

Further clear evidence of the patient's understanding is in the exchanges

Doctor: I'm gonna take your jacket off ...
Patient: OK.
Doctor: OK ... Maybe this vest, too ...
Caregiver: ...
Patient: You takin' my vest off? I can keep that on.

Here reference to the vest is to a postulated concept of the vest in the doctor's properties and in the patient's properties, too, if she has understood, for she can refer to her concept with *vest* and again through anaphora with *that*: *I can keep that on*. Further, she must have understood *take your jacket off* and *maybe this vest, too*, for she exhibits understanding that about the vest it is the taking of it off and can respond *You takin' my vest off?* And from this understanding she can add *I can keep that on*, exhibiting understanding that the contrary of taking it off is keeping it on. All through, properties and structures of properties are postulated and supported by the evidence in standard scientific fashion.

Now for the informed consent segment. Here, too, we have internal evidence of the patient's properties that are relevant and their changes.

Doctor: … Is it OK if we show this tape that we make today to other people?
Patient: Yes, guess [Raises eyebrows and holds them there.]
Doctor: That's all right with you?
Patient: It's all right with me.

So the patient first replies affirmatively and then again affirmatively when the doctor asks again. But when the doctor then rephrases his question negatively, she replies appropriately with *NO*.

Doctor: You don't mind having other people see a tape of you talking to me?
Patient: No. [Shakes head slowly.]

We could work out a more detailed analysis of this segment showing how the concept of showing the tape to other people is introduced into the properties of the participants, understood, and referred to again anaphorically by *that* and *it*, but it probably would reveal no anomalies distinguishing this from any conversation between normal people.

Given that the patient has exhibited an ability to give assent to taking the jacket off and withholding assent to taking the vest off, it is probable that here, too, we can take this segment at face value and conclude that this patient is indeed giving informed consent. A preliminary examination of the rest of the tape supports this conclusion.

6. DEVELOPING LINGUISTICS AS A SCIENCE. This first attempt at examining a communicative interaction with an Alzheimer's patient suggests that the new methods may hold promise and that further work along these lines may well be worthwhile. Although earlier work on communicative disorders may have provided important insights, if it has come to correct conclusions it has been

for the wrong reasons: It has inevitably been based on traditional frameworks incorporating grammatical or intuitive assumptions that must be rejected by standard science. Medicine is a serious business that deserves the best that science can offer. We can no longer afford in the study of communicative disorders to base our diagnoses and practice on a theoretical framework based in ancient philosophy instead of modern science. Thus the further building of confirmed medically relevant science on the new foundations takes on high priority. Much more needs to be done.

But the study of communicative disorders is just one area of the application of linguistics to a practical problem. The greater need is to further develop linguistics itself as a science. Consider the progress that has been made over the last two centuries: Ancient myths of the origin of language have been exploded. Fanciful etymologies have been abolished. The influence of Latin grammatical categories has been rejected. And linguistics has moved away from prescription to study instead how people actually talk. But linguistics has still retained its ancient semiotic-grammatical foundations and these are incompatible with modern science.

The new foundations now provide an opportunity to remove this last impediment of tradition and build a proper scientific linguistics that accepts only the four fundamental assumptions of standard science. The new foundations have been carefully checked and rechecked and are now sufficiently firm that I am willing to recommend their general adoption. I believe I have shown convincingly in the textbook that they can provide firm foundations for erecting scientifically acceptable approaches in every area and branch of general linguistics.

I want to take this opportunity to thank LACUS for its open-minded tolerance and friendly support during much of the three decades that I have devoted to this quest. In giving you these new foundations first, I hope to have opened up exciting opportunities and challenges for those of you who care deeply about the scientific health of our discipline. I hope the way is now clear for each of you in your own way to join this most important effort of moving linguistics fully into modern science.

In this effort there will be no gurus or owners of patented theories or approaches because there will be no special assumptions to be defended by ad hoc criteria or philosophical arguments or political appeals. Science is a collaborative enterprise with standard external criteria to be used in deciding what to believe about nature and these criteria are public and available to be applied by one and all.

> The standard criterion of acceptance of hypotheses or theories is the ability of their predictions to pass tests against the real world by means of careful observations and experiments.

And

> The standard criterion of acceptance of observational and experimental results is their reproducibility when questioned.

If we adhere firmly to these standard criteria of science and accept only the four fundamental assumptions of science, the future scientific health of our discipline will be assured.

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[1] This is an expanded version of the paper read at the LACUS meeting August 1996.

[2] The other members of the group are Barbara Sharf, Lisa Lane, Robert Knippen, and Dr. Neil Pliskin. Lisa Lane prepared an initial transcript of the interview and assisted in a literature search. The transcript and the analysis given here are the responsibility of the authors. This research was supported in part by a Home Health Care Research Grant from the Division of the Biological Sciences, The University of Chicago.

[3] The setup included 2 Sony DXC-3251 color videocameras on tripods with their CMA-8 camera adapters (power supplies) and CCU-M3 camera control units connected to a Sony SEG-2550A special-effects generator and Sony monitors. Archive copies were recorded on a Sony VO-9600 3/4 inch videocassette recorder (Umatic). The authors wish to express their appreciation to the University of Chicago Language Laboratories and Archives for the loan of this equipment. Analysis masters were recorded simultaneously on a Sony EVO-9650 Hi8 videocassette recorder with time codes. Copies were viewed with this machine on a Panasonic 1384Y 13-inch monitor. The recorder could be controlled in playback through an RS-232C interface by a Macintosh Performa 636CD computer running System 7.5 and Claris Works. The time codes could also be read through this interface and inserted automatically at the cursor position in the transcript being prepared.

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V. SYNTACTIC STUDIES

THE NATURE OF THE CAUSEE IN BINDING

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1. Introduction[*]. The standard binding theory in the generative tradition such as Chomsky (1981) and Reinhart (1976) assumes the structural condition on binding that an anaphor must be c-commanded by its antecedent. The relevance of the condition is illustrated in (1). (Underlining is used to indicate coreference.) In (1)a, an antecedent of the reflexive anaphor *herself* is *Mary* which c-commands the reflexive; in (1)b, *Mary* cannot be the antecedent because it does not c-command the reflexive. Likewise, an antecedent of the reciprocal anaphor *each other* is the c-commanding *the men* as in (1)c; it cannot be the one which does not c-command the reciprocal as in (1)d.

(1) a. *Mary* found pictures of *herself*.
b. **Mary*'s daughter found pictures of *herself*.
c. *The men* praised *each other*/ *each other*'s idea.
d. **Each other*/ *Each other*'s sons praised the men.

This paper discusses binding phenomena anomalous to the c-command requirement. The phenomena were first identified as a problem with psych-verb constructions (Akatsuka-McCawley 1976; Belletti & Rizzi 1988; Giorgi 1983/84; Lakoff 1971; Pesetsky 1987; Postal 1971; and others) and later re-identified as a property characteristic to more general nonvolitional (non-agentive) causative constructions (Campbell & Martin 1989; Fujita 1993; Katada 1990; Pesetsky 1990; and others). I provide further evidence that not all nonvolitional causatives display the anomalous behavior. I demonstrate a latent but influential role played by the Causee in binding and propose a tentative solution.

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2. PHENOMENA AND PROBLEMS.

2.1. THE C-COMMAND VIOLATION WITH PSYCH-VERBS. It is a well-known problem that the non-c-commanding mental EXPERIENCER object can bind into the subject THEME, violating the standard c-command requirement on anaphoric binding. As the examples in (2) illustrate, the EXPERIENCER object can be the antecedent of an anaphor embedded in the subject THEME, despite the fact that the object is not in the position which c-commands the subject.

(2) a. Pictures of *each other* annoy the *politicians.*
b. Stories about *herself* generally please *Mary.*
c. *Each other's* health worried the *students.*
d. *Each other's* books amazed the *men.*
(from Pesetsky 1987)

The examples in (3) reinforce the interpretation of the data that it must be the EXPERIENCER that can violate the c-command requirement (Girogi 1983/84 and Pesetsky 1987); the italicized arguments, which are embedded in the EXPERIENCER object but themselves are not the EXPERIENCER, cannot bind into the the subject.

(3) a. *Pictures of *each other* annoy the millionaire who funded the *politicians.*
b. *Stories about *herself* generally please *Mary*'s father.
c. **Each other*'s health worried the *students'* doctor.
d. **Each other's* books amazed the *men*'s teacher.
(from Pesetsky 1987)

It is confirmed by Akatsuka-McCawley (1976), Grimshaw (1990), Lee (1971), Pesetsky (1987), Ruwet (1972), and others that the c-command violation is allowed only when the subject of experience verbs is the nonagentive THEME and that it is not allowed if the subject is agentive. Thus, if we replace the nonagentive THEME subjects in (2) with an agentive subject as in (4), the intended coreference reading is no longer available.

(4) a. *Rivals of *each other* annoy the *politicians.*
b. *Friends of *herself* generally please *Mary.*
c. **Each other*'s teachers worried the *students.*
d. **Each other*'s wives amazed the *men.*
(cf. 2)

Thus, the context at issue seems to be (5), in which *NP (EXP)* in object position can bind an anaphor embedded in *NP (THEME)* in subject position.

(5) [S NP (THEME) V (psych) NP (EXP)]

According to a grammatical position in which the EXPERIENCER argument appears, psych-verbs discussed previously can be characterized as EXPERIENCER OBJECT (EO) verbs, and be distinguished from another set of experience verbs, the EXPERIENCER SUBJECT (ES) verbs. The two sets of verbs illustrated in (6)–(7) share the common semantic feature that they both are verbs of a mental state, but their argument structures apparently differ in that the EXPERIENCER and THEME arguments are inversed.

(6) ES-verbs:
a. John(EXP) fears ghosts(THEME).
b. Mary(EXP) enjoyed the movie(THEME).

(7) EO-verbs:
a. Ghosts(THEME) frighten John(EXP).
b. The movie(THEME) amused Mary(EXP).

The inversion of the two arguments has been assumed to be another anomaly characteristic of EO verbs. (For possible analyses, the readers may be referred to Anagnostopoulou 1995; Belletti *&* Rizzi 1988; Grimshaw 1990; Katada 1997; Pesetsky 1995; and Zubizarreta 1992, among others.) It is the EO verb constructions in which the c-command violation is consistently allowed.

2.2. THE C-COMMAND VIOLATION WITH CAUSATIVES. In their attempts to explain the argument structure of the EO (psych) verbs, Grimshaw (1990), Katada (1990, 1996), Pesetsky (1995) and others analyze them as instances of causative predicates. Their conclusion, though drawn from different reasonings, is consistent with the fact concerning the binding issue at hand noted by Campbell *&* Martin (1989), Fujita (1993), Katada (1990), Pesetsky (1990), and others—that causative predicates also display the permitted c-command violation. As the examples in (8) show, the object CAUSEE, even though it is not the mental EXPERIENCER, can bind into the subject CAUSER, violating the c-command requirement.

(8) a. *Each other*'s positive remarks encouraged *John and Mary*.
b. Negative remarks about *herself* convinced *Mary* that she made a mistake.

The contrast observed in (9)–(10) illustrates the fact parallel with psych-verb constructions (cf. (2) vs. (4)); that is, the c-command requirement can be violated, but only when the CAUSER is nonvolitional (THEME), as in the (a) sentences; it can never be violated otherwise, as in the (b) sentences.

(9) a. *Each other*'s encouragements helped *the students* significantly.
b. **Each other*'s teachers helped *the students* significantly.

(10) a. News items about *herself* generally make Sue laugh.
b. *A supervisor of *herself* usually makes *Sue* laugh.
(Campbell & Martin 1989)

Note that the examples in (9) are simplex lexical causatives, whereas those in (10) are complex, periphrastic, syntactic causatives. It seems that regardless of whether the causative is lexical or syntactic, the only factor allowing the c-command violation is its nonvolitionality (nonagentivity). Thus, the context at issue should be extended as in (11) which replaces (5). In (11), when the lower S is absent, denoted by (S), the structure is that of lexical causatives. Psych-verbs are precisely a subcase of lexical causatives (cf. Katada 1990; 1996).

(11) [S NP(-vol) V(cause) [(S) NP(CAUSEE)...]]

In short, as far as the data discussed so far are concerned, the volition/nonvolition dichotomy in causativity is the factor distinguishing the nonpermitted from permitted c-command violation. Various analyses proposed in the literature are all pursued under this dichotomy. I wish to show, however, that this dichotomy is not sufficiently far reaching.

2.3. NEW EVIDENCE. Evidence that would challenge the volition/nonvolition dichotomy comes from the contrastive causative pairs in (12)–(13). Despite the fact that the given sentences are all nonvolitional, only (a)s, but not (b)s, are grammatical under the intended coreference readings. (There is a clear contrast at least in each pair.)

(12) a. Stories about *herself* angered *Mary*.
b. ?*Stories about *herself* defamed *Mary*.

(13) a. Rumors about *himself* got *John* to leave the job.
b. ?*Rumors about *himself* got *John* fired.

This fact indicates that there should be more than nonvolitionality that is affecting binding possibilities.

The contrast in (12)–(13) seems crosslinguistically true, as Japanese displays a similar contrast:

(14) a. [Uwayaku-ga *zibun*-o kiratteiru to-iu uwasa] -ga
boss-NOM self-ACC dislike that rumor NOM

Taroo-o tuyoku si-ta/sase-ta.
Taroo-ACC strong make(LC)-PST/CAUSE-PST

'The rumor that the boss dislikes self strengthened Taro/made Taro strong'.

b. *[Uwayaku-ga zibun-o kiratteiru to-iu uwasa] -ga
boss-NOM self-ACC dislike that rumor NOM

Taroo-o kubi-ni-si-ta.
Taroo-ACC fire(LC)-PST

'The rumor that the boss dislikes self fired Taro.'

The relevance of nonvolitionality is at work in Japanese also, as confirmed by the volitional (agentive) causatives in (15) which do not allow the c-command violation.

(15) a. *[Zibun-o kiratteiru uwayaku] -ga Taroo-o
self-ACC dislike boss NOM Taroo-ACC

tuyoku si-ta/sase-ta.
strong make(LC)-PST/CAUSE-PST

'The boss who dislikes self strengthened Taro/made Taro strong'.

b. * [Zibun-o kiratteiru uwayaku] -ga Taroo-o
self-ACC dislike boss NOM Taroo-ACC

kookaku s-(s)ase-ta.
demote do-CAUSE-PST

'The boss who dislikes self made Taro demoted'.

Thus, nonvolitionality of causation, though certainly a necessary factor allowing the c-command violation, is not sufficient. The rest of the paper is devoted to making clear within the nonvolitional causative constructions what distinguishes the grammatical (a)s from the ungrammatical (b)s in (12)–(14).

3. SEMANTICS OF NONVOLITIONAL CAUSATIVES

3.1. VOLITIONALITY OF THE CAUSER. Let us first consider some semantics of causatives in general. Regardless of their volitionality, causative sentences in affirmative assertions presuppose certain factuality, a caused event, which results from an encoded causation process (Karttunen 1970). Thus in (16)–(17), the volitional (a) sentences and the nonvolitional (b) sentences equally presuppose the caused event expressed in the corresponding (c) sentence.

(16) a. The supervisor (intentionally) angered the staff.
b. The rumors (*intentionally) angered the staff.
c. The staff got angry.

(17) a. The director (intentionally) made the player famous.
b. The news (*intentionally) made the player famous.
c. The player became famous.

A difference between the (a)s and the (b)s arises as to a cause of the caused event. In volitional causatives, it is the volition of the CAUSER that brings on the event. This is evidenced by the fact that the agentive subject CAUSER can cooccur with the subject-oriented adverbial modifier *intentionally*, as in the (a)s, thus denoting the subject's intention. Here the CAUSEE's role in a causation process is rather passive so that it does not have as much control in bringing on the caused event as the CAUSER does.

By contrast, the volition of the CAUSER is not available in nonvolitional causatives. This is evidenced by the fact that in the (b)s the modifier *intentionally* cannot be used. If it is not the volition of the CAUSER, a question arises as to what brings on the caused event with nonvolitional causatives.

3.2. THE LATENT CAUSER FOR NONVOLITIONAL CAUSATIVES. I claim that in nonvolitional causative constructions, the real, logical CAUSER is distinct from the theme CAUSER appearing in the subject position. The logical CAUSER is latent on the surface. Let us call the theme CAUSER a 'grammatical CAUSER' hereafter to distinguish it from the logical CAUSER. In (18)a–(19)a, the logical CAUSER is not the same as the grammatical CAUSER per se but an implicitly assumed perceiver of it.

(18) a. The criticisms made John strong.
b. John became strong.

(19) a. The rumors got John fired.
b. John was fired.

The perceiver of the THEME CAUSER can be sentence-internally available in which case the object CAUSEE is the perceiver; otherwise, it is read off from the discourse. The former case is illustrated by (19)a which presupposes *John*'s perception of *the criticisms*, and this is the logical CAUSER for the caused event (18)b. Note that (18)b would not have taken place if *John* did not know *the criticisms*. Note also that causatives involving psych-verbs consistently belong to this case.

The latter case in contrast is illustrated by (19)a in which the perceiver is someone other than the CAUSEE *John*: *John's boss*, for example, who heard *the rumors*. In other words, the perception of the third party in discourse is presupposed, and this is the logical CAUSER for the caused event (19)b. Note that unlike (18)b, (19)b has already taken place regardless of whether or not *John* knew *the rumors*.

The relevance of the notion 'perception' is illustrated by (20) (drawn from Akatsuka-McCawley 1976 with modification) which shows that, due to her physical disability, when *Mary*'s perception of the *color*, but not of the *shape*, is blocked, the result is the semantic oddity.

(20) By having a peculiar shape/*color, the lamp persuaded Mary, who was blind, that she was in Borneo.

In short, the CAUSEE's role-play in a causation process is active in (18)a but passive in (19)a. This distinction, which I characterize as the CAUSEE's active-role/passive-role dichotomy, is crucial to define the context for the c-command problem.

4. ANALYSIS AND EXPLANATION. I first call attention to the fact that the CAUSEE's active-role vs. passive-role discussed above is the dichotomy into grammatical and ungrammatical in (12)–(14). That is, the c-command violation is allowed as in the (a) examples when the CAUSEE's perception of the theme (grammatical) CAUSER is presupposed (i.e., the CAUSEE's role is active). It is not allowed otherwise as in the (b) examples (i.e., the CAUSEE's role is passive). Note that the latter case subsumes the volitional causatives in which the CAUSEE's role is likewise passive and the c-command violation is likewise disallowed (e. g. (4) and (15)). Table 1 is the summary of what we have observed so far. (G. stands for 'grammatical' as opposed to 'logical'.)

	Nature of G. CAUSER	Logical CAUSER	A role played by the CAUSEE	C-command violation
1.	+volition	G. CAUSER	passive	not allowed
2.	-volition	3rd party	passive	not allowed
3.	-volition	G. CAUSEE	active	allowed

Table 1. Types of causatives

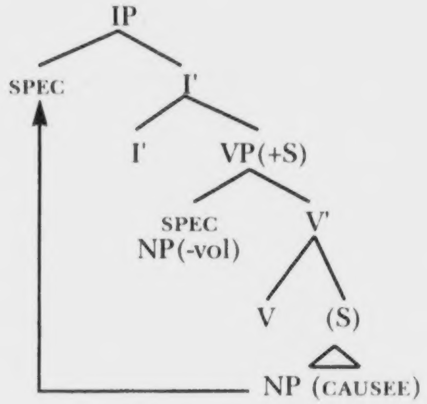
The context in which the c-command violation is allowed is with the third type of causative. Thus, it is the active/passive dichotomy from the CAUSEE's point of view, and not the volition/nonvolition dichotomy from the grammatical CAUSER's point of view, that distinguishes the context for the c-command issue. It is likely that the CAUSEE's role-play as the logical CAUSER is the key in analyzing the c-command problem. Naturally, a grammar of causatives should offer means to represent the logical CAUSER since it is crucial to the conception of causative sentences.

I propose that the logical CAUSER be the subject of the CAUSEE's perception process of the grammatical CAUSER and that this logical function of the CAUSEE be represented at the level of LOGICAL FORM (LF) in which logical values of sentences are evaluated.

One way to do this is by raising the CAUSEE higher than the grammatical CAUSER so that the CAUSEE-CAUSER relationship is subject-object of the latent, abstract, predicate PERCEIVE. The CAUSEE's landing site should reflect its logical property, the subject of PERCEIVE. Thus, the landing site should be a subject position different from the one of the usual, standard, subject. Such a position is not difficult to come by, given the VP-internal subject hypothesis proposed by Kitagawa (1986), Koopman and Sportiche (1986), Kuroda (1988), and others. Under the hypothesis, VP is the maximal projection corresponding to usual SENTENCE and the SPECIFIER of the maximal projection of INFLECTION (SPEC(IP)) and that of the maximal projection of VERB (SPEC(VP)) are both positions for the subject of a clause. Under this proposal, the D-structure subject is generated in SPEC(VP), but SPEC(IP) is available for another subject deserving element. This makes it possible for the CAUSEE to move into SPEC(IP), as characterized in (21), and in this way the subjecthood property of the CAUSEE is grammatically represented.

As a result of this movement, the CAUSEE is in a position which c-commands the nonvolitional CAUSER containing an anaphor. In other words, the permitted c-command violation perceived as anomalous is only an apparent phenomenon. Given that binding is checked at LF, the apparent violation is

(21)



completely nonanomalous, since, as claimed above, the c-command requirement is satisfied in LOGICAL FORM.

5. CONCLUSION. I have demonstrated that it is the CAUSEE's active vs. passive role-play, and not the CAUSER's volitional vs. non-volitional role-play, that would correctly single out the context for the c-command problem. I proposed that the CAUSEE's active role be characterized as the subject perceiving the THEME CAUSER and that such a subjecthood property be represented at the level of LOGICAL FORM in which the structure satisfying the c-command requirement is provided.

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COLLECTIVE AND DISTRIBUTIVE MARKING, OR: WHERE UNITY MEETS MULTIPLICITY

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IN THIS PAPER* I explore the typology and semantics of verbal collectivity. I will describe a number of categories falling under the rubric of event structure, i.e., categories defined by particular configurations of participants in an event, and the cross-linguistic marking properties found to be associated with those categories. This investigation is part of a larger research program reported on in Kemmer (1993a, 1993b, and 1995).

I begin with a preliminary definition, which will be made more specific below. A verbal collective marker is a form signifying that a group of entities is carrying out an action jointly or in concert. (Henceforward I will simply use the term *collective markers* to indicate the verbal type; there are, of course also nominal collective markers, which were studied separately in Kemmer 1993b).

The italicized forms in (1)–(3) illustrate collective markers in this type of language.

(1) Basque: *Batera* joan-go dira
together go-FUT AUX.3PL
'They are going to go together'.

(2) Fijian: erau sa *vei*-naki
they.DUAL COLL-intend
'They intend, have a common purpose'.

(3) Ainu: tun newa *u*-respa wa okai ruwe ne
they LOC COLL-live PROFESSIVE dwell VERBAL MARKERS
'They were living together'.

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*I wish to thank Michael Barlow and Joseph Greenberg for comments on an earlier draft of this work, and Aintzane Doiz-Bienzobas and Cyrus Azares for their informant judgements on Basque and Kapampangan, respectively.

The main goal of this paper is to show that the semantics of collectivity is more complex than it appears; that in fact, there are different types of collective categories in human languages which, I will claim, are best defined in terms of the overall marking systems they form part of.

I will also show that there is a perhaps surprising formal connection between two semantic categories that at first glance appear to be precisely opposite: the collective, marking joint action, and the distributive, marking separate action. Both collective and distributive markers show recurrent polysemy with reciprocal markers. The question is why a particular category would have formal connections with two opposite semantic structures. The answer, we will see, lies in understanding the semantics of collectivity and the structure of the domain of verbal number in general.

1. THE COLLECTIVE/DISTRIBUTIVE OPPOSITION. We can distinguish what appear to be the two main types of marking of a collective/noncollective opposition found in human languages. In the first, collective action is overtly marked, and the unmarked verb is not specific as to collectivity or distributivity. English is a good example of this *marked collective* system. In (4)a, for example, the adverbial *together* unambiguously indicates joint action, that is, the subject participants left as some kind of group, but (4)b, which is unmarked, leaves it open as to whether they all left together, or each on its own, for example, at different times.

(4) a. They left *together*.
b. They left.

Marked collective systems are widespread among the languages of the world. Examples of collective markers in this type of system from widely divergent languages are shown in Table 1. In some of these cases, the markers are verbal affixes (e.g., in Ainu, Shona), and some are adverbial (Basque, French). In these languages, the verbs or verb phrases that are marked occur without collective marking as well (e.g., Ainu *e* 'eat').

There is an important definitional issue here: how does one identify a collective marker? I took as collective markers morphemes that can be used to signal some kind of cooperative endeavor on the part of humans, and not simply common location or simultaneous occurrence of actions. That is, I included only those cases in which the grammar writer exemplified cooperation as a function of the marker.

The reason for this restriction is to exclude cases in which a putative collective marker actually turns out to indicate only spatial or temporal unity. It is clear from cross-linguistic observation that joint action on the part of humans is a recurrent target for lexical or grammatical coding, and this is the

COLLECTIVE	MARKER	EXAMPLE	
Ainu	*u-*	*u-*e	'eat together'
Basque	*batera*	*batera* joan	'go together'
Fulde	*intira/inira*	huw-*untura*	'work together'
Shona	*-ana*	pang-*ana*	'plot together'
Bella Coola	*-macw*	ʔalhpst-*macw*	'eat together'
Fijan	*vei-*	*vei-*naki	'have the same purpose'
French	*ensemble*	manger *ensemble*	'eat together'
Quechua (Imbabura)	*-naju-*	puri-*naju-*	'walk together'

Table 1. Marked collectives

category of interest here. Collective markers often do subsume the specific functions of spatial or temporal unity, and in some cases arise from lexical items with these functions (cf. Old English *to gædere* 'toward the same place'), a fact, interesting in itself, which indicates relations among these concepts.

The recurrence of the notion of joint action, that is cooperation in some purposeful endeavor, as the function of a specific marker, and the occurrence of other functions clustering around that marker, yet more sporadically present, suggests that joint action serves as the category prototype for collective markers.[1] The other functions indicating some type of 'commonality' that such markers often occur with are common location, common spatial goal, and common temporal occurrence. Given that joint action in the most usual case is characterized by all of these properties, as well as one further property, common type of action, we can hypothesize that collective markers most prototypically designate situations in which all these properties hold.

In the few languages which I can investigate in detail (the European languages and Basque), it is clear that none of the above-named properties is either a necessary or a sufficient condition for the appropriate use of the collective marker. It is generally not difficult to construct situations in which one of these properties fails, yet nevertheless the marker is usable, provided that the crucial property of joint cooperative endeavor is maintained. Consider, for example, 'writing a paper together' via e-mail (suspension of temporal and locative commonality), or 'making a dress together' (where the participants may divide up the task and hence carry out different types of actions); my informants report that the collective marker is felicitous in these situations.

Although I cannot conduct the same experiment for all the languages studied here, I propose the following hypothesis, which I believe to be robust: Collective semantics, although prototypically characterized by the constellation of properties described previously, can be more schematically characterized by a unitary conceptual frame imposed on a given situation by the speaker. Languages will differ as to how far the collective marker will be able to be stretched to cover nonprototypical situations in which one or more of these usually occurring, but contingent properties does not hold. They will also differ with regard to how conventionalized or entrenched particular senses beyond the prototype are, such as common location or even the more schematic 'unitary frame' sense itself. Thus, we can characterize the collective both as a cross-linguistically valid category definable around a prototype, and, suitably particularized to take account of language-specific conventions of extension, as a category in any given language with a collective marker.

A second point to note is that languages of this type, as far as I have been able to investigate, often do allow the overt expression of some kind of separateness of action, whether by means of adverbials that mean something like 'separately' or 'one after the other', or else they can approximate it with some nominal expression meaning 'each'. But it is rare to find a grammar with a collective marker that discusses the expression of separateness, leading me to conclude that in languages with this type of marker, 'separateness' tends not to be a grammaticalized notion. Thus, in many languages, even if it is possible to express some type of distributivity, the marking in this domain is, so to speak, built around collectivity.

The other major type of system in this domain was noticed by Frans Boas in work on American Indian languages (e.g., Boas 1911). He recognized that in many of these languages, it is the distributive rather than the collective which is the marked category. In these cases a verbal affix, or even more commonly, a reduplicative formation, indicates unambiguously that there are separate actions involved. The unmarked case, on the other hand, suggests *lack* of separateness, which, when the subject is plural, has at the very least a strong implication of collectivity.

I will discuss the specific type of cases observed by Boas in Section 2.2. For now, an example from Hiligaynon will serve to illustrate this opposition. In (5) the prefix *masig-* gives the effect of 'each one separately', or more generally, each participant performing a particular type of action alone.

(5) Hiligaynon (Philippine):
Masig-lakat sila pagtapos sang kaon.
DIST-walk they finishing of.the eating
'Each one will leave after he finishes eating.'

Table 2 gives some examples of this type of marker, which I term the *marked distributive.* Markers of this type, as might be seen from the table, appear to be relatively more heterogeneous, compared with the collective markers, as to what kind of separateness they designate, and I will discuss the various kinds

DISTRIBUTIVE MARKER		EXAMPLE	
Big Nambas	(*redup.*)	tutu	'distribute' (*tu* 'give')
Hiligaynon	masig-	masig-luto	'each cook alone'
Mono	*-nawi*	tyhka-nawi	'eat in several places'
Eastern Pomo	*-lVlV-*	ka.lalaxa.	'cut in pieces; cut heads off many fish'
Gooniyandi	(*redup.*)	gaj-gaj	'cut up, chop up'
Yessan-Mayo	(*redup.*)	niri nariti	'look around at different things' (*niri* 'look around')

Table 2. Marked distributive

of separation later on. Despite the heterogeneity, one can usefully generalize over these cases. They all have in common the fact that there is a highly grammaticalized (typically derivational) way of signalling some type of separateness associated with the verbal event.

Furthermore, in some of these languages it is difficult to find any lexical or grammatical expression for explicitly signalling collectivity (e.g., Kapampangan, for which I was unable to elicit any form meaning specifically 'together'; the closest expressions were those meaning 'in the same place' and 'at the same time'). Separateness of actions, on the other hand, in these languages is a highly salient property that is marked when contextually present. Thus, in languages with distributive markers but no real collective marker, it appears there is a single system, built around distributivity.

Some languages have grammatical marking for both categories; for example, Mono has both the distributive form *-nawi* and a collective suffix *-qoi*. Such languages can be said to have a three-way marking system (distributive, collective, and unmarked). It appears that such languages show similar polysemy patterns to the two-way marking systems.

We can now turn to the polysemy patterns associated with these markers, which turn out to be revealing.

2. POLYSEMY. I take recurrent cross-linguistic polysemies as an indication of semantic relations among the categories expressed by the markers, as argued in various publications (e.g., Kemmer 1993a). If this is true, then recurrent polysemies can be used as a tool for elucidating the structure of the collective/distributive domain in human language.

2.1 POLYSEMY OF COLLECTIVE MARKERS. Let us consider first the marked collective type. The most widespread recurrent polysemy found in the data is reciprocal function—that is, marked collectives are often also reciprocal markers. In Table 1, the languages whose collective markers are also reciprocal markers are Ainu, Fulde, Shona, Bella Coola, and Fijian.

Lichtenberk (1985), in his revealing study of reciprocal marking, noticed how widespread this polysemy is and suggested an explanation of or motivation for it. Reciprocal semantics prototypically involves two participants who are acting on each other; each participant serves two roles, which can be thought of as initiator and endpoint roles in the action associated by the verb (cf. Kemmer 1993a, 1995). In collective events, there are two or more participants who act not on each other, but in concert, possibly but not necessarily on some other entity. Lichtenberk suggested that with collectives, the participants also serve two roles: one is initiator of the verbal action, and the other is *companion* of the other participants in the verbal action.

We can refine this analysis if we look a little more closely at reciprocal and related semantics. In Basque, there is an adverbial form *elkar* that can be glossed as 'together' (in specific contexts, as we will see). *Elkar* is the normal marker of reciprocal semantics, as illustrated in example (6).

(6) Basque: Guk *elkar* ikusi genuen.
We.ERG together see AUX.TRANS.PAST
'We saw each other'.

But *elkar* can also be thought of as indicating a collective-like construal, specifically with a comitative case ending, as in (7). The expression *elkarrekín joan* 'go together' is often used in contexts of social engagements, e.g., when people are going together to see a movie.

(7) *Elkar*-rekin joan-go dira.
together-COM go-FUT AUX.TRANS
'They are going to go together'.

The Basque case and the rest of my data lead me to suggest the following hypothesis: the case where collective and reciprocal expression are most likely to converge in one formal marker, within and across languages, is in the expression of a specific type of event: one which is neither strictly collective nor strictly reciprocal, although it shares properties with both categories. Certain specific predicates are closely associated with this intermediate category, like DANCE, PLAY, COMPETE, QUARREL, and TALK.

What do such predicates have in common? In the situations designated, two participants are engaged in a mutually interactive activity characterized by a significant level of energy input on both sides, which we can term *energetic interaction*. So far, this is no different from ordinary reciprocal semantics, and it remains to distinguish the two categories. In the prototypical reciprocal situation (e.g., 'hit each other', 'touched each other'), the energy input *directly affects* each participant. As such, the level of affectedness is relatively high. In the 'dance with each other' type, on the other hand, the interaction is *indirect* rather than direct. This is why we typically find some oblique preposition or case marking present rather than a simple transitive construction with the affected entity as direct object. The focus with such constructions is not on affectedness of the participants by the verbal action, but on mutual interaction. There is far more input from both sides, for example in the fact that each participant must adjust his/her actions to a considerable extent to those of the partner, or the mutual activity designated cannot be said to take place. The sense of accompaniment in carrying out some overarching event is therefore considerably strengthened compared to the reciprocal.

I call this type of event configuration the *indirect bilateral*. This term implies contrast with the reciprocal, which is characterized by a direct bilateral energetic interaction, and the collective, which prototypically involves a group interaction.

We can directly compare the indirect bilateral and the collective by looking again at Basque, which actually distinguishes the two. Basque has a collective marker *batera*, which we saw in (1), repeated here:

(1) Basque: *Batera* joan-go dira
together go-FUT AUX.3PL
'They are going to go together'.

Sentences (1) and (7) ought to mean the same thing if both *batera* and *elkar* are collective markers, but in fact they contrast in meaning. Sentence (7) indicates a greater degree of back-and-forth interaction between the two participants. For example, there is almost certainly social interaction between the two participants such as conversation, eye contact, or gesture, whereas (1) can describe a situation in which the two participants are just riding in the same car, without communicating. There is still construed to be some type of interaction between them, but it is confined to some degree of mutual awareness and perhaps common purpose, but not the more energetic engagement that conversation or other communication implies.

In Figures (1)–(3) I have tried to schematize the three types of situations discussed in this section: the prototypical reciprocal in Figure 1, the indirect bilateral in Figure 2, and the collective, in Figure 3. The arrows signify the verbal relations. The reciprocal and indirect bilateral are represented as having some back and forth energy transfer, i.e., energetic interaction. With the indirect bilateral, the arrows are represented as curved to suggest the indirect nature of the energy transfer.

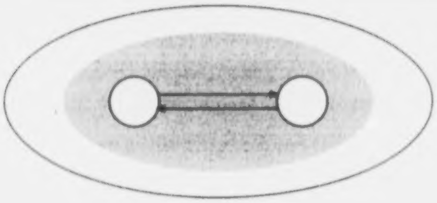

Figure 1. Reciprocal prototype

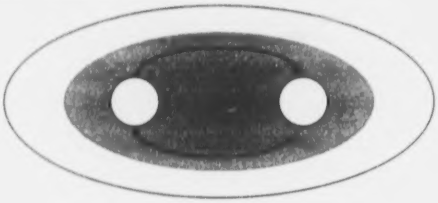

Figure 2. Indirect bilateral

The interior shaded area on each diagram is intended to represent the semantic property of cooperative interaction or accompaniment, which is conceptually different from the energy transfer that is designated by verbal relations linking participants. The two properties are, however, metonymically or situationally related, as we will see.

The variable darkness of the shading across the three diagrams represents the degree to which the property of cooperative interaction is prominent in each type. In the reciprocal configuration, it is not a salient aspect of the meaning, but just a property that derives from the semantics of the single clause construction.[2] The energetic interaction constituted by the verbal relations is the most salient and indispensible facet of the reciprocal configuration.

The cooperative interaction property becomes progressively more salient in the indirect bilateral and the collective. In the indirect bilateral, as already indicated, the sense of accompaniment in the process of an overarching event is stronger than in the reciprocal case, but the energetic interaction is equally strong. In the collective, however, there is no restriction to a bilateral interaction between two participants; in fact, the prototypical collective involves more than two participants. The energetic interaction is therefore absent, and the focus is on the companionship, cooperation, common goal, and so forth. If there is any 'back-and-forthness' that can be construed in a collective situation, it derives not from the verbal action, but from the mutual accompaniment aspect—each participant accompanying the other in carrying out the action designated by the verb.

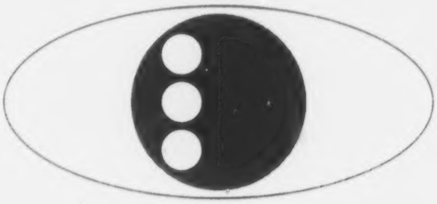

Figure 3. Collective prototype

In Figure 4, I have laid out the three situation types in relation to each other in a way intended to represent the semantic relations between them. Collective and reciprocal are in bold to suggest their special status as *prototype* categories in human language, that is, natural targets for distinctive and characteristic marking, cross-linguistically (cf. Kemmer 1992). The indirect bilateral, on the other hand, isn't a prototype category, since as the data show, expression for that category typically comes from one of the other two types which with it is more primarily associated.

Collective ———————— Indirect Bilateral ———————— **Reciprocal**

Figure 4. Indirect bilateral as a semantically intermediate category

Further evidence for positing the intermediate category of indirect bilateral comes from examples cited in grammars. In general, if language has a marker that subsumes reciprocal and collective semantics, we typically find that the grammar writer has cited one or more indirect bilateral predicates marked with the same marker. This is what we expect from the semantic relations represented in Figure 4; we do not expect polysemies to 'jump over' intermediate categories (Kemmer 1993a).[3] For example, the Ainu verbs cited in (8) and the Fijian examples in (9) show this three-way polysemy. The (c) examples denote bilaterally interactive semantics with varying degrees of obviousness. Even Ainu *u-tura* 'live with each other', if the English gloss is accurate, represents a situation in which two or more interact in the same social unit. (If the participants lived in separate households under the same roof, then 'live with each other' would be an incorrect gloss.)

(8) Ainu:
  a. collective: *u*-čiškara 'weep together (in mourning)'
  b. reciprocal: *u*-ekuba 'bite each other'
  c. indirect bilateral: *u*-koytak 'talk with each other'; *u*-tura 'live with each other'

(9) Fijian:
  a. collective: *vei*-naki 'have the same purpose'
  b. reciprocal: *vei*-lomani 'love one another'; *vei*-kilai 'know one another'
  c. indirect bilateral: *vei*-talanoa 'talk (tell yarns together)' [talanoa 'to tell a story']; *vei*-caqe 'to play football' [caqeta 'to kick']

These are just examples from a large number of cases where a marker of collective semantics also designates more energetic interactional semantics. The importance of such semantics is highlighted by the frequent occurrence of semantic extensions that clearly derive most directly from the bilateral, rather than the collective configuration. In Fulde, for example, there is a marker *intira* or *inira* (the morphological alternation is complex) which has a collective use described by Reichardt (1876) as 'simultaneous action and cooperation', a sense found in (10)a. The marker seems, however, to be more primarily associated with bilaterality than collectivity. Observe the reciprocal and indirect bilateral examples in (10)b and c (glossed exactly as in Reichardt):

(10) Fulde:

a. collective: huw-*untura* 'work together'
b. reciprocal: war-*untiri* 'kill one another', hen-*intiri* 'insult each other'
c. indirect bilateral: wot-*inira* 'barter with each other', tet-*inira* 'exchange tokens of respect with each other'
d. 'oppositional': dak-*untira* 'encamp opposite each other'
e. turn-taking: fell-*intira* 'relieve each other, take turns' (e.g., in praying).

The oppositional and turn-taking senses in (10)d and (10)e can be quite precisely described as semantic extensions of the bilateral sense. For reasons of space I defer to a later discussion the precise semantics of the extension patterns; it is enough to note here that the energetic interaction in these cases is not literal, but a subjectified construal of interaction (cf. Langacker 1991). These same extensions are found cross-linguistically for reciprocal markers.

2.2 POLYSEMY OF DISTRIBUTIVE MARKERS. Now let us look at the characteristic polysemies found with the distributive markers. These sometimes include reciprocal semantics, just as in the case of the marked collectives. A fundamental difference is that the primary senses associated with the markers have more clearly to do with separateness per se, and rather than interaction. We find, specifically, *iterative* or *repeated* action; *dispersive* action (i.e., motion resulting in separate or different location, instead of same location like the collectives); *intensive*, and *continuative* and *habitual* semantics. The relations among these will be discussed shortly. For the moment we can describe this type as involving multiple separate actions.

Some examples of a polysemous distributive marker are given in (11) from Big Nambas, an Oceanic language. The form of the marker is reduplication of the root morpheme. (11)a shows intensive meaning, which adds the idea that the action is performed with extra speed or energy; (b) and (c) show habitual and dispersive construals.

(11) Big Nambas

a. Intensive:	i-	tr-tr-	nina		
	he	cut-cut	grass		
	'He was cutting the grass vigorously'.				
b. Habitual:	tisa	lera	i-	rp-rp	kam'em'.
	teacher	that	he	hit-hit	us.EXCL
	'That teacher is always flogging us'.				
c. Dispersive:	a-	v-	tu-tu	a	nelnal
	they	PL-	give-give	to	everybody
	'They distributed them to everybody'.				

What is interesting about distributives, and motivates treatment as a single type despite the somewhat heterogeneous nature of these markers, is that they cluster round a different family of senses than the collective/reciprocal markers. In contrast to the notion of a relatively unitary but internally complex event, there is a fundamental association with *multiplicity* of action, involving some construed distinguishability or separation of subevents.

The relations among these categories are not difficult to discern, and a number of them were described in Greenberg (1991). Iterative action involves temporal repetition, i.e., a sequence of actions of the same type. Repetition not only involves more energy expenditure over all, but the individual actions are likely to be energetic as well, especially when an object is involved. Repetition and vigor of action are particularly likely to cooccur where the subject entity desires to create an intense effect on an object.

We can thus understand how a marker of repetition can come to be situationally associated with intensiveness, and in time come to conventionally mark that property, even where repetition is not present, as perhaps is the case in the situation described in (11)a. Repeating an action on different occasions can be described as habitual; repeating it on one occasion at short intervals can lead to the construal of a continual and finally durative event (where the action is more stative than punctual). Repeating an action incorporating a change in location might lead to participants ending up in different places, which is a dispersive event type.

One sense that frequently appears with distributive markers is action on multiple objects. For example in Kwaio, an Oceanic language, there is a prefix *kwai-* that is used on verbs when more than one object is acted on: for example *lango-ni-a* 'feed him/it' but *kwai-lango-ni-ga* 'feed everyone' (the suffixes represent bound pronominal forms). Similarly we find *fida* 'slap' but *kwai-fida* 'clap the hands', with a dual object. The first example is very close to the dispersive sense illustrated above in Big Nambas, and in fact there is another example cited which explicitly indicates a dispersive effect: *dau-a* meaning 'afflict (him) or destroy (it)', but *kwai-dau* 'spread affliction'.

In Kwaio, unlike in Big Nambas, the distributive marker is actually the reciprocal marker as well. A similar polysemy is found in Siuslawan, where the primary function of the marker *-naw(a)* is reciprocal, but in a few cases it also expresses 'distribution in action', as exemplified in (12): (the 'literal' glosses are reproduced directly from Frachtenberg 1922b).

(12) Siuslawan

reciprocal:	ʟol-	'to hit'
	ʟolna'wans	'we two (incl.) hit each other'
distributive:	t!ᴇ'mxuᵘ-	'to cut'
	ᵘlt!ᴇmxᵘna'ᵘuᵘn	'he cut it into pieces' [lit. 'he cut it here and there']
	lqu'nwi	'knot'
	lqunwina'hutun yaa'xai	'he made lots of knots' [lit. 'he made many knots here and there']

These distributive/reciprocal polysemies suggest a connection between repeated actions and reciprocal, which makes sense, given the fact that in reciprocal events each participant must be an initiator of a like action, and so two actions are entailed, a situation construable as a repetition. In a well-known case of iconic motivation, repeated actions are often coded with reduplicative formations in the languages of the world, as the examples in Table 2 attest (cf. Moravcsik 1978). Reciprocals, given their potential construal as a repetition of like actions, are often expressed by reduplication as well. Another connection between reciprocal and separateness of action is that some reciprocal markers have their diachronic origin in markers of distributivity or repetition. English *each other* has its source in the nominal distributive *each*. The Manam reciprocal formation is composed of the prefix *e-* which by itself indicates 'a close, intimate (often physical) union', and the common Austronesian suffix *-í* which according to Lichtenberk (1985) indicates 'at least two occurrences of an event'.

Not all distributive markers, however, are reciprocal markers or derivationally related to them. In fact one of the most intriguing patterns found in connection with distributives is often found in languages in which the reciprocal marker is a completely distinct formation. In this pattern, the distributive marker can be used in the expression of a multiplicity of particular participants. Specifically, the distributive occurs on intransitive verbs with plural subjects, and on transitive verbs with plural objects. That is, it groups intransitive subjects and transitive objects together with regard to plurality—a type of patterning which falls under what Moravcsik (1978) calls 'natural ergativity'.

For example, Karok, a language of Northern California, has a distributive suffix *-va* which can appear with plural intransitive subjects such as *θivru'hti·h-va* '(several objects) to be floating', as well as with plural transitive objects, as in *pasnapi'šri·h-va* 'to glue down (several)'.

Looking at the functions of *-va* exemplified in (13) (Bright 1957:92–93) shows a picture very similar to the other distributive markers discussed above.

(13) Karok:

a.	repetitive:	taknah	'hop'
		takná·h-*va*	'play hopscotch'
		ví·k-paθ	'weave around (once)'
		vikpá·θ-*va*	'weave around and around'
b.	interruptive:	ikre·myáhiš(rih)	'start to blow'
		ikre·myahi'šri·h-*va*	'blow off and on'
c.	mass action:	ʔápakunih	'(earth) to slide down'
		ʔapaku'ni·h-*va*	'to be a landslide'
		yuh	'spit'
		yúh-*va*	'to vomit'
d.	plural action:	θivrú·htih	'(one object) to be floating'
		θivru'hti·h-*va* (with plural intrans. subj.)	'(several objects) to be floating'
e.	plural action:	itráa·mnihtih	'to be looking into (one object)'
		itramni'hti·h-*va* (with plural trans. obj.)	'to be looking into (several objects)'

f.	dispersive:	vúrunih	'flow down (in a single stream)'
		vuru'nih-*va*	'flow down (in several streams)'
g.	durative:	ʔímnih	'to love'
		ʔimníh-*va*	'to be in love'

The familiar repetitive function is displayed in (13)a; (13)b, which is closely related semantically, indicates an intermittent stop and start action, obviously involving repetition. In (13)c, we find *-va* indicating mass motion, which has number-like properties, and in (13)d, position of multiple entities, where the relevance of number is even clearer. In (13)e again we find multiple entities, but this time they are patient objects. The case in (13)f has affinities with both the mass action and the plural action cases in (13)c and d, since the flowing entity is mass-like but splits into several entities that can be viewed as multiple initiators. The relevant entity is also dispersed over space, although here the result is relatively discrete entities (separate streams) rather than a single diffuse mass; as such it is similar to the dispersive Big Nambas example in (11)c. The final example in (13)g shows the extension of repetition to temporal continuity, with the latter interpreted as duration, as is appropriate for a stative event.

The ergative-like pattern illustrated in examples like (13)d and (e) is widespread in many American Indian languages. It was described by Frachtenberg (1922)a for Coos, then later by Swadesh (1946) in Chitimacha. Taken in isolation, such a pattern would seem to suggest that the verbal marking directly indicates something about *nominal*, rather than verbal number; yet examination of the functions of such markers more generally indicate that their primary function is to modify verbal event structure: they mark construed internal multiplicity or complexity of the verbal event itself.[4] The connection between the two notions is situational: Multiple actions are typically associated with multiple participants (cf. Holiskey 1985).

These observations, however, are not quite sufficient to explain the ergative-like patterning that emerges in various languages with respect to the number and function of participants. Why is it that the multiplicity of specifically transitive objects and intransitive subjects is relevant, but not multiplicity of transitive subjects?

Greenberg (1991), in discussing evidence of the same ergative patterning in ancient Semitic languages (and the 'distributive' polysemies that accompany them), provides an explanation for this intriguing phenomenon. As noted above in Section 1, Franz Boas observed that in marked distributive systems, the morphologically unmarked category is associated with a collective construal. Greenberg makes the crucial observation that the unmarked case in the naturally ergative type of system is that of singular transitive objects. The marked case, on the other hand, covers the cases in which the intransitive subject or the transitive object is plural. We thus have an opposition of marked multiple action vs. unmarked action unspecified for multiplicity—with lack of marking presumably frequently occurring in cases of single actions.

Situations of the unmarked type, with single objects, can have either singular or plural subjects. With single subjects, the situation will virtually necessarily be one that is construed as a single action. Multiple actions would presumably most likely be expressed with the marked form. With plural subjects, presumably there is more room for construal: logically, we can view multiple subjects as acting together or separately.

Greenberg's claim is that in fact, there is a strong bias to view such situations, i.e., those with plural subject and singular object, as collective events. This contrasts with situations in which there are multiple objects or multiple subjects and no objects, where the bias is the other way. He states:

> If one or more agents acts on a plurality of things, the action on plural objects is almost certain to be viewed distributively as separate actions on a number of distinct objects. On the other hand, separate agents can only carry out the same act on a particular plurality of objects [read: a particular object] by a concerted action, thus collectively. For an intransitive verb, since there is no object towards which action is being directed, each subject will in the usual case be acting independently'.

In other words, separateness of objects facilitates, on the part of the speaker, a construal of separateness of the actions on those objects. For example, for sentences of the type *We shot some buffalo* it is likely that the various buffalo were the targets of various episodes of shooting, where the agents were acting to a considerable extent independently of one another. Such a construal motivates the use of a multiple action or distributive marker. Action by many converging on a single object, on the other hand, suggests planning or cooperation on the part of the actors in the instance of the action designated by the verb. In *We shot a buffalo,* multiple people may be, as in the other case, firing shots; but the actions are spatio-temporally more closely connected and the shooters are most likely accommodating themselves to the others in trying to get at the same buffalo. The result is an interpretation of action in concert, and the use of the unmarked form.

So emerges the basic contrast between transitive singular objects, with collective construal for plural subjects and no marking on the verb, and transitive plural objects, with the verb overtly marked with the distributive marker, signalling separateness of action. The case of the plural intransitive subject patterns with plural transitive objects because *there is no object to facilitate a construal of a single action*, and thus we find a construal of many actions, not thought of as actions in concert.

These natural motivations for associating a multiplicity-of-event marker, and its absence, with specific configurations of event participants, repeated over time, have led to the entrenchment or grammaticalization of this marking pattern. We might expect that in some languages the pattern can become so grammaticalized that construal plays a reduced role—i.e., even where plural intransitive subjects are seen to be acting jointly, lack of an object will dictate the marked form.

3. RELATIONS BETWEEN THE TWO TYPES OF SYSTEM. My claim so far is that there are two major types of marking patterns, one centered around a semantic configuration in which there is an event that is unitary, but internally complex, the other around an event that is complex without a great deal of overarching unity attributed to it. We have also observed that the same basic kind of situation, namely a reciprocal one, can be subsumed under the marking for either of these configurations, with a difference in conceptual weighting of the factor of overarching unity: in the case of the reciprocal configurations that are subsumed under collective markers, as in Fijian or Fulde, unity is a highly salient factor, whereas with those that function as distributive markers, a greater degree of conceptual weight attaches to the multiplicity factor, and unity is backgrounded. It is not altogether absent in the latter case, due to the tendency to construe events expressed in one clause as in some measure unitary (Kemmer 1995).[5]

This characterization captures the intuition that the collective and the distributive are in an essential sense semantic opposites; one focuses on unity, the other, on separateness. But it also suggests that they share significant commonalities: specifically, the multiplicity or complexity of the similar processes internal to the event, and the factor of conceptual unity, however, backgrounded, inherent in both.

In Figure 5, I have attempted to situate the categories discussed here, and other event structure categories I have investigated, in relation to one another.

The three major categories dealt with—the collective, reciprocal, and distributive—are laid out on a left-right axis representing degree of conceptual unity or *conceptual fusion* of the subevents involved in the event (with collective situated on the left at the pole of maximal fusion, and distributive at the other end of the scale on the right). The reciprocal is precisely intermediate: it can be construed as more single-event like, as in languages that subsume reciprocal and collective under the same marking (overt marking, or simply shared intransitivity). Conversely, it can be seen as more multiple event-like, as in the languages that have shared marking for reciprocals and distributives.

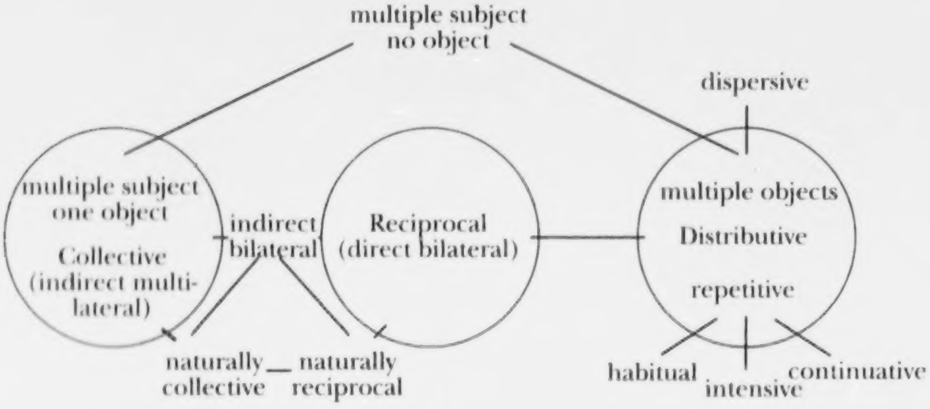
multiple subject
no object
multiple subject
one object
Collective
(indirect multi-
lateral)
indirect
bilateral
Reciprocal
(direct bilateral)
dispersive
multiple objects
Distributive
repetitive
naturally collective
naturally reciprocal
habitual
intensive
continuative

Figure 5. Reciprocal/collective domain

Languages can choose to schematize, or abstract, the commonalities in the configurations either toward the left or toward the right.[6]

In the top center I have placed a category of 'multiple subject—no object', i.e., the case of plural intransitive subjects. These are related along a different semantic parameter. They relate to the distributive category in the fact that they have multiple participants most likely construed as acting separately, motivating their patterning with distributives with multiple objects in the naturally ergative type systems. On the other hand, they bear a semantic affinity to collectives, given the potential for cooperation among multiple subjects and the relative conceptual unity of a clausal event. Some languages treat the presence or the nature of objects as less important in their overall scheme for marking event structure than the construal of the subjects per se. Hence the marked collective type system, in which a single marking subsumes all multiple subjects construed as groups.

I hypothesize that the treatment of plural subjects in a particular language very much depends on which semantic property in the collective/distributive domain, multiplicity or unity, is considered the salient property to mark. Plural subjects are most likely to be construed as collective when there is a single object for them to focus their efforts on, specifically in a system where multiplicity is the salient characteristic to mark. On the other hand, if unity of action is the semantic characteristic that the grammar treats as important, then the participants to whom that action accrues are not relevant in the marking pattern, and the marked category makes no reference to their properties. The two types of system, then, are grammatical conventionalizations of two alternative possible construals motivated by the external properties of the events perceived and constrained by an overall framework provided by our human propensity or attunement to the properties of unity and multiplicity.

The semantic map in Figure 5 has not only synchronic, but diachronic implications. I hypothesize that the category of intransitive plural subjects, because of its special affinities to both 'opposite' categories, collective and distributive, might be especially likely to serve as a diachronic transition point for a marker of one type to change to a marker of the other. Distributive markers of the naturally ergative type might be very likely to undergo reanalysis as collective markers—for example, if the contrast with the transitive singular objects were lost. The reason I believe it is more likely that distributive would be reanalyzed as collective, rather than the opposite directionality, is that marked distributive situations, by virtue of being expressed in a single clause, already have a certain measure of unitariness, even if it is backgrounded, as noted above. On the other hand, it is harder to imagine a marker with no appreciable sense of separation coming to develop one.

It seems reasonable that a multiplicity originally associated with separateness might come to be taken as a multiplicity associated with unity, in a process of change of degree of salience associated with the component semantic factors in a construed situation. In this hypothesis, a facet of meaning which is incidental to the semantic characterization of a category (viz., a certain degree of unitariness) could emerge over time as an important defining characteristic of the category. Such 'figure/ground reversals' are known to occur in semantic change.[7] Because semantic representations are complex, integrated gestalts (cf. Lakoff 1987), it is possible to have such shifts of focus on the part of language users, which over time can reinforce each other by repetition and thus become conventionalized. The result can be the restructuring of an entire system of oppositions.

I will not pursue this idea further here, but I believe there is evidence for it in the cross-linguistic data that I have collected.

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[1] See Kemmer (1992) for a discussion of the identification of grammatical prototypes via crosslinguistic investigation

[2] Since the two entities constitute a joint subject and there is a single verb, they are easily construed as engaged in one mutual overarching event, and as such there is a measure of conceptual unity present, although it is not the main part of what is being designated.

[3] Greenberg (p.c.) has called this expectation the 'thesis of continuity', cf. Greenberg (1990a)

[4] Mithun (1988) makes this point in discussing the Karok example given in (13) (from Bright 1957). She concludes (p. 216), 'the primary function of *-va* is to multiply actions. It may imply that the actions are distributed over multiple agents or multiple patients, but this is a secondary effect'.

[5] In Kemmer (1995) it is shown that if component subevents in an event construed as reciprocal are given a greater degree of separateness, e.g., by means of of increased temporal or spatial separation, this increases the likelihood that they can or must be expressed in separate clauses.

[6] The issue of how semantic maps like Figure 5 can relate to language-specific schemas is discussed in Barlow and Kemmer (1994).

[7] A case of this is discussed in Greenberg (1990b) which identifies a recurrent semantic/grammatical change of markers signifying first person inclusive, which is incidentally and prototypically dual, to include indicators of duality per se, which then spread to other persons besides first.

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THE DOUBLE-ABSOLUTIVE CONSTRUCTION IN TSEZ

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TSEZ*, one of the Tsezic languages within the Daghestanian subgroup of the Nakh-Daghestanian language family, makes a distinction between absolutive, affective, and ergative types of constructions. *Absolutive Constructions* are formed by intransitive verbs. In Absolutive Constructions, the only argument of the verb is marked by the absolutive case and that argument controls agreement with the predicate.

(1) çurq'o obij ciq-qā-Ror iƙi-s
morning father:ABS(CL1) forest-SER7-DIR(CL4) CL1:go-PAST.EV
'In the morning, a father went to the forest'.

A number of intransitive verbs, which are commonly described as perception verbs or psychological verbs, trigger *Affective Constructions.* The affective verbs are *eswa* 'find', *eta* 'love, like', *šuŁa* 'forget', *rija* 'know', *teqa* 'hear', *ç'ała* 'become known', *ikwada* 'see', *aca* 'hate', *çaƙ izi oqa* 'by bored, bother', *žuka rija* 'miss'.

In Affective Constructions, the experiencer is in the dative case and the stimulus/source is in the absolutive case. Agreement with the predicate is controlled by the absolutive argument. Example (2) shows the case marking and agreement pattern of an Affective Construction.

(2) obi-r zej b-ikwaj-si
father-DAT(CL1) bear:ABS(CL3) CL3-see-PAST
'A father saw a bear'

Ergative Constructions are formed by transitive verbs. The A argument of the Ergative Type of Construction is expressed by the ergative case and the O argument is expressed by the absolutive case. Agreement with the predicate is controlled by O. The example below is illustrative.

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*This study is based in part on work supported by the NSF under grant SBR-9220219. I am grateful for comments by Bernard Comrie, Aaron Huey Sonnenschein, and participants in the Twenty-third LACUS Forum. The abbreviations are A - an ergative argument of a transitive sentence, S - a single argument of an intransitive sentence and an absolutive argument of an affective sentence, O - an absolutive argument of a transitive sentence, D - a dative argument of an affective construction.

(3) obij-ā riLu r-iLi-x
father-ERG(CL1) field:ABS(CL4) CL4-plough-PRES
'A father is ploughing a field'.

DOUBLE-ABSOLUTIVE CONSTRUCTION. Alongside the ergative type (3), Tsez also employs the Double-Absolutive Construction (DAC) (4) as a possible case marking option. In DACs, both arguments of the sentence are marked by the same absolutive case. The first absolutive argument controls the agreement with the copula, while the second absolutive argument controls the agreement with the lexical verb.

(4) obij riLu r-iLi-x ič-āsi
father:ABS(CL1) field:ABS(CL4) CL4-plough-IMP.GER CL1:be-RES
'A father is ploughing a field'.

The question naturally arises from (3)-(4) why Tsez has two parallel types of construction in an already complicated system; what are the factors which give rise to the ergative vs. double-absolutive distinction?

In linguistic literature, DACs have traditionally been considered as an instance of tense-aspect conditioned ergative split, dividing the verbal morphology into nonergative and ergative domains (Alekseev 1980; Comrie 1978; Comrie, Polinsky & Rajabov 1995; Dešeriev 1959). However, the examples in (5) show that the differentiation between the ergative (5)a and double-absolutive (5)b constructions is not conditioned by the tense/aspect forms of the verb. This fact rules out the tense/aspect based hypothesis.

(5) a. obij-ā riLu r-iLi-x zow-si
father-ERG(CL1) field:ABS(CL4) CL4-plough-CONT.GER be-PAST
'A father was ploughing the field'.

b. obij riLu r-iLi-x zow-si
father:ABS(CL1) field:ABS(CL4) CL4-plough-CONT.GER be-PAST
'A father was ploughing the field'.

One could claim that the distinction between ergative and double-absolutive types is conditioned by voice. In (5), one could argue, the ergative argument of the ergative construction (5)a is demoted/promoted to the absolutive one (5)b. But syntactic processes that promote or demote one or another argument of the clause from one syntactic position to another are always reflected in the verbal morphology. The Tsez verbal form, however, remains unchanged. See the examples given in (5), where the same verbal complex derives ergative and double-absolutive types. This suggests that the differentiation between ergative and double-absolutive types is not conditioned by voice.

In this investigation, I suggest that DACs do not show any discrepancies with respect to the norms of ergativity. I believe that the so-called DAC in fact has a biclausal structure, with the matrix clause formed by the intransitive verb (copula) 'be', and the subordinate clause formed by the transitive gerund in the imperfective aspect. This hypothesis will be confirmed by word order.

It is generally accepted that Tsez is a verb-final language. In transitive sentences, the neutral order is A-O-V. However, the order of NPs can vary. The order of the verb can also be changed. So the clause given in (6)a can have the variations given in (6)b:

(6) a. už-ā kid j-išer-si
boy-ERG(CL1) girl:ABS(CL2) CL2-feed-PAST.EV
'A boy fed a girl'.

b. kid už-ā j-išer-si
už-ā j-išer-si kid
kid j-išer-si už-ā
j-išer-si kid už-ā
j-išer-si už-ā kid

In contrast, the constituents of complex sentences have certain restrictions not applicable to the constituents of the simple clause. The restrictions are generalized in (7) below and confirmed by sentences (8), where the insertion of the constituent of the upper clause *uži* 'a boy' (8)c, or the insertion of the entire upper clause *uži ikis* 'a boy went' (8)d inside the lower clause *kid jišerno* 'feeding a girl', makes those sentences ungrammatical.

(7) *The constituents of the matrix clause cannot be inserted inside the subordinate clause.*

(8) a. [uži [kid j-išer-no] iƙi-s]
boy:ABS(CL1) girl:ABS(CL2) CL2-feed-GER CL1:go-PAST
'A boy fed a girl and went out'.

b. [kid jišerno] [uži iƙis]

c. *kid uži jišerno iƙis

d. *kid uži iƙis jišerno

Crucially, the word order restrictions that Tsez makes in complex sentences (8)a–d are applicable also to DACS. Compare the complex sentences given in (8) with the DACS in (9). It is obvious that the sentences (8)c–d and (9)c–d are ungrammatical because they contradict the rule generalized in (7).

(9) a. kid [meši b-išer-xo] [jičā-si]
girl:ABS(CL2) calf:ABS(CL3) CL3-feed-GER CL2-be-PAST
'A girl is in the state of feeding a calf'

b. [meši b-išer-xo] [kid jičā-si] 'A girl is in the state of feeding a calf'

c. *meši kid b-išer-xo jičā-si 'A girl is in the state of feeding a calf'

d. *meši kid jiÇc›asi b-išer-xo 'A girl is in the state of feeding a calf'

One might argue that DACS have word order restrictions to fill morphological (absence of the separate case for A) and syntactic (absence of predicate-argument agreement) gaps. For instance, in (10) both NPS are marked by the same absolutive case, and neither gerund nor copula show class agreement with the arguments (in Tsez only verbs with an initial vowel can take prefixal class markers). Therefore, one could claim that the expected ambiguity (two different readings) of the sentence is avoided by the fixed word order.

(10) a. [[uži [kid žeƙxo] joł]]
boy:ABS girl:ABS beat-GER be:PRES
'A boy is beating a girl'. / *'A girl is beating a boy'.

b. [[kid [uži žeƙxo] joł]]
'A girl is beating a boy'. / *'A boy is beating a girl'.

It seems, however, that fixed word order is not determined by the necessity to avoid different readings. First, different readings can be avoided by making pragmatic restrictions. For instance, all of sentences in (11) have only one reading: 'A father is reading a book'. However, the sentence (11)b is ungrammatical with the given reading. Note, however, the sentence (11)b would be grammatical with the reading 'A book is reading a father', but this is pragmatically illformed.

(11) a. [obij [ƫek ƫeƫer-xo] joł]
father:ABS book:ABS read-CV go-PAST
'A father is reading a book'.

b. *ƫek obij ƫeƫerxo joł
'A father is reading a book'.

Second, different readings can be avoided by means of reference tracking devices—class/number agreement. For instance, in (12), the arguments of the sentence are recognised by class/number markers. However, the sentence (12)b is still ungrammatical.

(12) a. kid meši b-išer-xo j-ičā-si
girl:ABS(CL2) calf:ABS(CL3) CL3-feed-GER CL2-be-PAST
'A girl is in the state of feeding a calf'

b. *meši kid išerxo jičāsi
'A girl is in the state of feeding a calf'

Third, within the simple clause, Tsez retains free word order even if it gives the sentence two different readings. Look at the mono-clausal sentence in (13) in which both A and O elements of the transitive clause, expressed by the first and second person pronouns, are marked by the same absolutive case. However, Tsez still allows word order variation; both variants are potentially ambiguous.

(13) a. mi di išer-xo
you:ABS I:ABS CL:feed-PRES
'I feed you // You feed me'

b. di mi išerxo
'I feed you // You feed me'

In contrast, neither complex sentence (14) nor DAC (15) allows word order variation. Compare mono-clausal sentences (13) with the complex sentences (14) and DACs (15). In sentences (12)–(15), both arguments are expressed by the absolutive case. However, only (13) allows word order variation giving the sentence two different readings. Two different readings are excluded in both (14) and (15). In these sentences, the first absolutive argument is in S position of the matrix clause, while the second absolutive argument is in O position of the subordinate clause. An argument of the subordinate clause A is omitted, being coreferential to the S of the matrix clause.

(14) a. [[mi [di išer-no] iƙi-s]]
you:ABS I:ABS CL1:feed-GER CL1:go-PAST
'You fed me and went away//*I fed you and went out'.

b. [[di[mi išer-no] iƙi-s]]
'I fed you and went away'.

(15) a. [[mi [di išer-xo] jol]]
you:ABS I:ABS CL1:feed-GER be:PRES
'You are feeding me//*I am feeding you'.

b. [[di [mi išer-xo] jol]]
'I am feeding you//*You are feeding me'.

Within the complex and DA constructions, word order restrictions generalized in (7) are applied not only to the absolutive NPs but to other constituents as well. For instance, in both (16)a and (16)b, the order of absolutive NPs are the same. However, sentence (16)b is ungrammatical. The sentence is ruled out by the insertion of the locative NP of the upper clause *ciqqāRor* 'to the forest' inside the lower clause.

(16) a. [[uži [kidno žeƙ-no] ciqqāRor oxis]]
boy:ABS girl:ABS-CON hit-GER forest-LOC run-PAST
'A boy hit a girl and ran to the forest'.

b. *uži kidno ciqqāRor žeƙno oxis

Similar restrictions apply also to DACs, as in (17). Assuming that the sentence (17) comprises two clauses, we can explain that (17)b is ungrammatical due to the fact that the locative NP Ł'āŁ 'on the roof' of the upper clause is inserted inside the lower clause.

(17) a. [obij Ł'ā-Ł [isi č'aLi-x] ič-āsi]
father:ABS roof-LOC snow throw-GER stay-RES
'A father is on the roof throwing the snow'.

b. *obij isi Ł'āŁ č'aLix ič'asi

Word order restrictions in Tsez complex and double-absolutive constructions thus provide striking evidence in favor of the biclausal interpretation of these constructions. So sentence (18) consists of two clauses. The matrix clause is *obij zowsi* 'father was'. The subordinate clause is *nesā riLu rLix* 'he is ploughing a field'. The intransitive verb of the matrix clause *zow-* 'was' assigns absolutive case to the *Sobij* 'father'. The transitive verb of the subordinate clause *riLix* 'plough' assigns ergative case to the A *obijā* 'father-ERG' and absolutive case to the O *riLu* 'field:ABS'. The ergative argument of the subordinate clause, however, is omitted, being coreferential with the absolutive argument of the matrix clause. In contrast, sentence (19) consists of one clause which is formed by the transitive verb *riLix zowsi.* That verb assigns an ergative case to the argument *obij* 'father' and absolutive case to the argument *riLu* 'field'. The clause structures of the sentences (18) and (19) are given in (20) and (21) respectively.

(18) obij riLu r-iLi-x zow-si
father:ABS(CL1) field:ABS(CL4) CL4-plough-CONT.GER be-PAST
'A father was ploughing the field'.

(19) obij-ā riLu r-iLi-x zow-si
father-ERG(CL1) field:ABS(CL4) CL4-plough-CONT.GER be-PAST
'A father was ploughing the field'.

(20) NP1 [O1 NP2 V_{tr}] V_{intr}

(21) NP1 NP2 V_{tr}

As was pointed out earlier, Tsez applies the DAC (22) as a possible structural option parallel to the ergative one (23). The question arises from the similarities in the data given in (22)–(23) whether or not these constructions were developed independently or they go back to the same source. The data we have show that the ergative type developed out of the double-absolutive type in a process of fusion. This process transformed a biclausal sentence (18) into a mono-clausal one (19).

The ergative construction (19) developed out of the biclausal one (18) in three stages:

FIRST STAGE: During this stage, the verb of the matrix clause zowsi 'was' has autonomous semantic meaning and argument structure, and this verb governs the syntax of the matrix clause.

SECOND STAGE: At this stage, the verb of the matrix clause eventually loses its independent semantic meaning and argument structure and is reanalyzed as a grammatical component (tense marker) of the verb of the subordinate clause. So, two formerly independent verbs (the V of the subordinate clause and the V of the matrix clause) are fused together to produce a new verb with main verb and auxiliary.

The process of incorporation of two verbs into one is especially obvious in (24) and (25). In (24), the word ānu 'not' is an independent verb of the matrix clause. In (25), the former independent verb ānu 'not' is attested as a function morpheme.

(24) obij riLu r-iLi-x ānu
father:ABS(CL1) field:ABS(CL4) CL4-plough-GER be:NEG.PRES
'A father is not in the state of ploughing a field'.

(25) obij-ā riLu r-iLi-x-ānu
father-ERG(CL1) field:ABS(CL4) CL4-plough-GER-NEG.PRES
'A father is not ploughing a field'.

Third stage: Incorporation of the verb of the matrix clause with the verb of the subordinate clause changes the government of the clausal syntax. Now, it is the main verb (originally the verb of the subordinate clause) which governs the syntax of the entire sentence. That verb determines the number of arguments, their case forms, and an agreement pattern.

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ON THE SEMANTICS OF OBJECT COMPLEMENT CONTROL IN ENGLISH

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THE NEED TO WORK out a system of control has been recognized at least since Radford's (1981:381) programmatic statement against arbitrary controller assignment. He pointed out that specifying the control properties of each individual verb separately is inadequate for two reasons:

> Firstly, arbitrary lists of properties associated with predicates have no predictive or explanatory value: ask the question 'How do you know this is a verb of subject control?', and you get the non-answer 'Because it's listed as a verb of subject control in the Lexicon'. Secondly, treating control (of PRO) as a *lexically governed* phenomenon implies that control properties are entirely arbitrary, and hence will vary in random fashion from dialect to dialect, or language to language: this would lead us to expect that the counterpart of:
>
> ... John persuaded Bill PRO to leave...
>
> in some other dialect or language would have subject control rather than nonsubject control... But as far as we know, this is not the case. And we would hope that an adequate Theory of Control should explain why this is not the case. (Radford 1981:381)

The most comprehensive and systematic treatment of complement control in English in the spirit of Radford's statement so far is undoubtedly provided by Sag and Pollard (1991). They espouse the HPSG model of grammatical description, but major parts of their account lend themselves as a point of departure for the treatment of control even if one does not want to adopt this framework with its particular conventions and formalisms.

They propose the three types of control given below and illustrated with some verbs selected from their lists. (The following is quoted, with the lists of verbs abridged, from Sag and Pollard 1991:65).

ORDER/PERMIT type [object control]:
order, persuade, direct, induce, encourage, incite, forbid, allow, permit, force

PROMISE type [subject control]:
promise, swear, vow, try, intend, refuse, decide, endeavor, attempt, offer, aim
WANT/EXPECT type [subject control]:
want, desire, wish, hanker, itch, hope, yearn, hate, aspire, expect

One might quibble with some aspects of the taxonomies, for instance, having *promise* and *try* in the same class, or, more precisely, having *try* classed as a verb of the *promise* type might call for some elaboration. (Perhaps *try* might be analyzed with an ingredient of meaning along the lines of 'making an effort' (see Rudanko [1989:23]), additional to the meaning of 'commitment', which characterizes Sag and Pollard's PROMISE type.) However, this is a very minor quibble and does not detract from the merit of Sag and Pollard's approach. One of the most valuable aspects of this approach is that, unlike some other treatments, it does not restrict itself to one or two verbs but seeks to take account of a fair number of matrix verbs and to formulate generalizations to cover their control properties.

The purpose of the present contribution is to consider the character and status of the one class that Sag and Pollard have for object control, the '*order/permit* type'. With respect to the semantics associated with this control type they observe:

> Verbs of the *order/permit* type all submit to a semantic analysis involving STATES OF AFFAIRS (SOAS) where a certain participant (the referent of the object) is influenced by another participant (the referent of the subject) to perform an action (characterized in terms of the SOA denoted by the VP complement). The influencing participant may be an agent (as in *Kim persuaded Sandy to leave*) or a nonagent (as in *Ignorance of thermodynamics compelled Pat to enroll in a poetry class*). The semantics of all verbs in this class thus involves a SOA whose relation is of the influence type. With respect to such SOAS, we may identify three semantic roles, which we will refer to as INFLUENCE (the possibly agentive influencer), INFLUENCED (the typically animate participant influenced by the influence) and SOA-ARG (the action that the influenced participant is influenced to perform (or, in the case of verbs like *prevent* and *forbid*, NOT to perform). [Footnote omitted, J R]. (Sag & Pollard 1991:66)

In line with much traditional and current work outside of the HPSG framework, the complement in question will here be considered a sentence rather than a VP. Setting this issue of category aside, there is no doubt that Sag and Pollard have identified an important semantic type of object control. The type is important in English and its analogues are important in other languages. It is also clear that the type fulfills Radford's requirement that control properties of such verbs do not vary randomly in English. It may also be supposed—even though this cannot be substantiated here—that control properties of their analogues do not vary randomly in other languages.

One limitation of Sag and Pollard (1991) regarding the data base taken into account is that their presentation rests almost exclusively on a consideration of matrix verbs governing infinitival complements. In the following, some patterns involving *-ing* complement clauses will be investigated, with an eye to exploring the generality of the *order/permit* type of object control. The patterns in question are among those that I investigated in my study of several different prepositional complementation patterns in present-day English (see Rudanko 1996). The data for this study came not only from intuitions of native speakers but also from corpora, the Brown and the LOB corpora, in particular. Additionally, it turned out that the work of traditional grammarians, especially that of H. Poutsma, furnished a large number of relevant matrix verbs and illustrations of usage that are convincing because of their authenticity. In this context, account should be taken both of Poutsma (1905) and of Poutsma (1929), which is a second edition, and of his dictionary (Poutsma ms). The grammar, of course, is well known, but the dictionary is virtually unknown and remains unpublished to this day. Yet it contains much valuable data and insightful and sensitive discussion, especially in regards to different complementation patterns in English and their relation to each other.

Of the patterns of complementation that I have investigated, three are object control constructions. These may be illustrated with one example each, as in (1)a–c. (1)a–c are represented in a schematic form in (2)a–c, analyzed in a minimal way.

(1) a. The rebuff reduced John to groveling before his idol.
b. They entrusted John with counting the money.
c. They accused John of stealing the money.
(2) a. [[The rebuff]$_{\text{NP1}}$ [reduced]$_{\text{Verb1}}$ [John]$_{\text{NP0}}$ [to]$_{\text{Prep}}$ [[PRO]$_{\text{NP2}}$ [[groveling]$_{\text{Verb2}}$ before his idol]$_{\text{VP}}$]$_{\text{S2}}$]$_{\text{S1}}$
b. [[They]$_{\text{NP1}}$ [entrusted]$_{\text{Verb1}}$ [John]$_{\text{NP0}}$ [with]$_{\text{Prep}}$ [[PRO]$_{\text{NP2}}$ [counting]$_{\text{Verb2}}$ the money]$_{\text{VP}}$]$_{\text{S2}}$]$_{\text{S1}}$
c. [[They]$_{\text{NP1}}$ [accused]$_{\text{Verb1}}$ [John]$_{\text{NP0}}$ [of]$_{\text{Prep}}$ [[PRO]$_{\text{NP2}}$ [stealing]$_{\text{Verb2}}$ the money]$_{\text{VP}}$]$_{\text{S2}}$]$_{\text{S1}}$

Each of the three patterns is typically an object control construction, with PRO controlled by the direct object of the matrix clause, or by NP_0, to use the symbols used in (2)a–c. To facilitate discussion, the pattern of (2)a may be termed the transitive *to…-ing* pattern, that of (2)b the transitive *with…-ing* pattern and that of (2)c the transitive *of-ing* pattern.

We may now examine the nature of matrix verbs in each pattern and the extent to which Sag and Pollard's *order/permit* type may be relevant to them. As far as the transitive *to...-ing* pattern is concerned, here is a sample of matrix verbs selecting it (from Rudanko 1993, 1996:77):

> *assign, condition, confine, delegate, drive, introduce, inure, pin down, reconcile, reduce, relegate, resign, subject*

One or two authentic examples from the corpora may be adduced here (cf. Rudanko 1996:73):

(3) a. For years he wore hand-me-down suits and homemade collars, was even driven to scrounging for cigarette butts in Vienna's gutters. (Brown B24 1730–50)
b ...in this small way do the leaders of a city, or of a nation, inure the masses to watching, or even inflicting, torture and death, upon their fellow men. (Brown B19 1400–20)

It seems clear from the examples that the 'influencing' type of account is quite appropriate for verbs of this type. Using the terms introduced in (2)a–c, we may say that the entity or force that is designated by NP$_1$, the influence, moves NP$_0$, the entity influenced, to perform the act or carry out the activity that is designated by the SOA argument that is expressed by the lower clause. As in Sag and Pollard's account, the influenced entity is typically +animate. (For further discussion of verbs of the pattern, for instance, of semantic subclasses of the patterns and of the alternation that is sometimes possible between *-ing* form and infinitival complements, cf. Rudanko 1996:77 ff).

Turning now to the transitive *with...-ing* pattern, we may observe that there are some verbs in the pattern that are susceptible to analysis in terms of influencing along the lines of verbs of the previous pattern. For instance, such verbs include *busy* and *occupy*, as in *They busied/occupied him with filling unnecessary forms*, and *entrust*, as in *They entrusted him with counting the money*. However, none of these three verbs were found in the corpora in this pattern and the examples produced have been invented.

The corpora are by no means devoid of examples of the transitive *with...-ing* pattern, however. Here are illustrations of one or two of the most common verbs and usages, from Rudanko (1996:152 f.):

(4) a. They were also jointly charged with stealing a car belonging to Herbert Arthur Peel at Bristol between January 1 and January 2. LOB A11 73–74.

b. Local authorities credited the men with saving the girl's life.
Brown A24 1500–10.

A taxonomy of verbs of the transitive *with…-ing* pattern, together with semantic analyses, can be found in Rudanko (1996:155 f.). Some further examples, lifted from the taxonomy, are *accredit, reproach, upbraid,* and *taunt.*

The illustrations of usage in (4)a–b suggest that an analysis on the basis of the notion of influencing, while it is adequate enough for the transitive *to…-ing* pattern, is not appropriate for these verbs of the transitive *with…-ing* pattern. To be sure, as noted in Rudanko (1996:153), *charge* may have a sense for which it is appropriate, but this sense of the verb, as in *The king charged his ambassador with delivering his message,* seems less common in present-day English and is different from the sense that the verb has in (4)a. Similarly, as far as the second illustration is concerned, it does not mean that the authorities influenced the men in the direction of saving the girl's life.

Provision should therefore be made for a second semantic type for object control. The term 'imputative' or 'ascriptive' may be proposed for this type. The basic meaning of the type is that 'the referent of NP_1 makes a claim about the referent of NP_0, ascribing or imputing to the referent of NP_0 some action or property that is presented in a certain light, by way of a reproach, an accusation, etc.' (Rudanko 1996:159 f.). If we want to coin terms in the spirit of Sag and Pollard (1991) for the semantic roles involved, we may perhaps call the role of NP_1 as that of the 'imputer', that of NP_0 the 'target', and that of the lower clause as the SOA that is imputed.

One difference between the influencing type and the imputative type concerns the relation of the higher predicate to the lower predicate from the point of view of time. In informal terms, it may be observed that as far as the influencing type is concerned, the action designated by the lower predicate is typically subsequent to the time of the higher predicate: when NP_1 influences NP_0 to undertake some action, it stands to reason that the action suggested follows the act of influencing, or is at least cotemporaneous with it. The action suggested is hardly likely, even on commonsense grounds, to have been performed prior to the time of the act of influencing. However, in the case of the imputative type, the action or property designated by the lower clause is normally a preexisting state of affairs, something that is represented as holding prior to the time at which the act of imputation takes place. This is the case in the authentic examples cited from the corpora.

Turning now to the final type of object control to be discussed here, that of the transitive *of…-ing* pattern, we may again first sample some authentic examples of usage:

(5) a. Uncle Sam would then accuse them of creating a monopoly by 'unfair competition'. Brown A36 0580–90.
b. ...a number of other manufacturers were recently convicted of engaging in a conspiracy... Brown A36 0450.
c. ...who were always suspected of being shy on virility... Brown F38 1660.

As far as the transitive *of...-ing* pattern is concerned, it seems that the usefulness of the influencing type is fairly limited, at least if usage recorded in the Brown and LOB corpora is considered. Some verbs, including *accuse, convict,* and *suspect,* illustrated above, are very common in the pattern in present-day English, but the notion of influencing does not lend itself to their analysis. By contrast, the usefulness of the imputative type established above on the basis of the transitive *with...-ing* pattern is confirmed. As is clear from the illustrations in (5)a–c, the entity designated by NP_1 makes claims about the entity designated by NP_0, ascribing some action or property to the latter.

There are also one or two verbs of the transitive *of...-ing* pattern, though these are less common and do not seem attested in the corpora, that call for an analysis along the lines of 'removal of imputation' or 'imputation lifting': the entity designated by NP_1 removes or withdraws some imputation previously ascribed to the entity designated by NP_0. (I am indebted to Ian Gurney for his comments on how this type should be labeled.) *Acquit* is a case in point, as in example (6), cited by Poutsma (1929:906), from Macaulay, *Lord Clive,* 522a (cf. also Rudanko 1996: 174):

(6) We cannot acquit him of having done what, if not in itself evil, was yet of evil example.

It seems plausible to extend the notion of imputation to handle imputation lifting, without the need for a new major type.

To sum up, it has been argued here that the analysis of the semantics of object control constructions requires that at least two distinct types of matrix verbs be postulated. It is clear that the *order/permit* type proposed by Sag and Pollard (1991) is needed and this need is substantiated in the present contribution by a range of data not considered by them. However, a consideration of the broader range of data also reveals the need for an imputative or ascriptive type. The contribution explores the motivation for this type in two different prepositional complementation patterns in present-day English.

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A THIRD SOURCE FOR WORD ORDER

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1. INTRODUCTION.

1.1 LANGUAGE AND LINEAR ORDER. One of the most interesting unsolved questions about language concerns the source of the linear order manifest in both speech and writing. This is all the more interesting when we consider that our knowledge systems, which are the source of the messages we communicate, are stored without linear order. That is, everything in the semantic content of a particular message is known NOW. The strict temporal linearity of speech/writing must therefore be imposed on the message by the language-specific linguistic system being used to encode it.

The neurological means for imposing linear order is not the problem here. Lamb (1980) proposes a plausible mechanism for such an imposition of linearity that is consistent with our current knowledge of neurology. Lamb limits his exposition to the sequence of phonemic features in a syllable. But if his proposal is anywhere near the mark, it is likely to have applications throughout an individual's linguistic system. This is good, because it is highly unlikely that all linearization is applied at a single point in the encoding process, a point to which I return in section 6.2.

Neurological mechanisms aside, however, the present study focuses on the relation of linear ordering to linguistic theory. In particular, my interest is in linear order in syntax, the order of words across a clause. This order has received a good deal of attention, with one of two explanations being favored at different times. I begin by looking at the approaches to order taken by traditional grammar, transformational-generative grammar (hereafter *Chomskyan linguistics* or *C-lin*) and functional grammar.

1.2 SYNTACTIC ORDERING. Traditional grammarians never attempted to explain word order. They merely accepted it as a given (Curme 1947:passim). They concentrated on identifying morphosyntactic categories and relating them to each other. For them linear order is simply a fact of speech. Early structuralists took the same view of linearity while trying to make the description of categories and their interrelations more rigorous and scientifically repeatable (Fries 1940; Wells 1947).

Meanwhile, Prague School functionalists from Mathesius to Trnka were pointing out that certain positions in the clause, e.g., thematic position, could communicate a particular discourse function. To this Halliday (1967–1968) added the interplay between marked sentence stress and possible sentence-final position for communicating new information. This predicted the appearance of sentence constituents in certain marked positions, but it left most questions about word order unanswered.

C-linguists from Chomsky 1957 through the present assume that linear order is the left-to-right product of sentential tree structure.[1]

There are modifications on these views, however widely held they may be. Isačenko (personal communication) long ago suggested to me that the unmarked word order in Slavic languages realizes clause structure and discourse or semantic function accounts for the deviations. This is a perfectly reasonable suggestion which is compatible with Halliday (1967–1968) and corresponds to my own experiences with Slavic languages, Bulgarian excepted. There is, of course, considerably more to the description of Russian (or Polish or Czech) word order, but an extension of Isačenko's general approach goes a long way. Yet there is a residue of complex sentence types that appear to be outside the command of even Isačenko's suggestions. This residue constitutes the inspiration for the present study.

1.3 THE RESIDUE DATA. Pushkin's sentence (1), taken from the beginning of the second chapter of Pikovaja dama, *The Queen of Spades*, can be rendered exactly as (2).

(1) *Grafinja… pošla za širmami*$_{l}$ *okančivat' svoj tualet*$_{A}$.
The countess went behind the screen to put the finishing touches on her toilette.
(2) *Grafinja… pošla okančivat' svoj tualet za širmy*$_{A}$.

Both (1) and (2) answer two questions: where did the countess walk to and where did she finish her toilette? That is, the screen in (1) and (2) is both the goal of the countess's movement and the place where she finishes her morning preparations. In this case it might be claimed that the pragmatics of the situation affect the understanding. However, there are examples where the pragmatics of the situation do not contribute to the interpretation,[2] and this type of construction is productive. The question I address is how to account for the message communicated, the two nonparaphrastic modes of communicating it, and the implications for the description of language.

2. THE DATA

2.1 SYNTACTIC DATA. To the initial sentences (1) and (2), repeated here for convenience, I add several simple and complex sentences to fill out a structural paradigm. All sentences are given in unmarked word order. Note that I = instrumental case and A = accusative case.

(1) *Grafinja pošla za širmami*$_I$ *okančivat' svoj tualet*$_A$.

(2) *Grafinja pošla okančivat' svoj tualet*$_A$ *za širmy*$_A$.

(3) *Grafinja pošla za širmy*$_A$ *(*širmami*$_I$*).*
The countess walked (to) behind the screen.

(4) *Grafinja okančivala svoj tualet*$_A$ *za širmami*$_I$ *(*širmy*$_A$*).*
The countess put the finishing touches on her toilette behind the screen.

(5) *Grafinja pošla za širmy*$_A$ *otdoxnut' na minutu*$_A$.
The countess walked (to) behind the screen to rest for a minute.

(6) *Grafinja pošla za širmy*$_A$ *(*širmami*$_I$*), čtoby okančivat' svoj tualet*$_A$.
...in order to put the finishing touches on her toilette.

(7) *Grafinja pošla za širmy*$_A$*, gde ona okančivala svoj tualet*$_A$.
...where she put the finishing touches on her toilette.

(8) **Grafinja pošla za širmami*$_I$*, gde ona okančivala svoj tualet*$_A$.

(9) **Grafinja pošla, gde ona okančivala svoj tualet*$_A$*, za širmy*$_A$.

(10) **Grafinja pošla, gde ona okančivala svoj tualet*$_A$ *za širmami*$_I$.

(11) *Grafinja okančivala svoj tualet*$_A$*, za širmami, kuda ona (uže) pošla.*
The countess finished her toilette behind the screen, where she had (already) gone.

2.2 MORPHOLEXICAL DISCUSSION. Several Russian locus expressions occur in doublets that realize the *gde* 'at what place' (LOCUS) vs. *kuda* 'to what place' (GOAL) distinction. In these doublets a single preposition is paired with two different cases. The preposition communicates the geometry of the situation. The distinction between the cases communicates the difference between the object as the goal of some movement and the object as a simple locus. In the present case, *za širmami*$_I$ (*za* + I) communicates LOCUS *&* PATH *&* POSTERIOR. That is, the prepositional phrase specifies a location on a path on the side of the object away from an observer. Conversely, *za širmy*$_A$ (*za* + A) communicates LOCUS *&* PATH *&* POSTERIOR *&* GOAL. That is, the prepositional phrase specifies movement to a location on a path on the side of the object away from an observer (cf. Sullivan 1986).

There are certain cooccurrence restrictions here. As (3) and (7) show, verbs of directed movement like *pošla* take the goal complement (*za širmy*) and are incompatible with the simple locus complement (*za širmami*).

Conversely, as (4) shows, a verb like *okančivala*, which involves no movement, can occur with the simple locus expression (*za širmami*) but is incompatible with the goal complement (*za širmy*). These restrictions are semantic rather than syntactic and need not be accounted for here. They can simply be accepted as givens in the syntactic description, to which I now turn.

3. THE STRUCTURE OF THE SIMPLE SENTENCE

3.1 THE CLAUSE. There are two simple sentences in the data set, (3) and (4), repeated here for convenience. To these I add the subclauses in (5) and (10).

(3) *Grafinja pošla za širmy*$_A$ *(*širmami*$_I$*).*
(4) *Grafinja okančivala svoj tualet*$_A$ *za širmami.*
(5) *...(gde) ona okančivala svoj tualet*$_A$*.*
(11) *...(kuda) ona (uze) pošla.*

Each of these examples has exactly one clause, and I take my preliminary description of the unmarked Russian clause from them. Given the restricted data set, there is insufficient evidence to establish the details of clause structure. However, the basic facts concerning unmarked word order are here, and certain structural generalizations can be made.

The Russian clause displays a consistent order in the examples: the nominative subject comes first, then the verb, then up to two post-verbal complements. The two complements attested are an accusative object and a prepositional phrase. There may be no complement. If only one complement is present, it may be either an accusative object or a prepositional phrase. If two are present, the accusative object comes first, then the prepositional phrase. Of course, Russian clause structure is considerably more complex than this, but a more fully generalized structural description will still have to take the above facts into account.

It is possible to provide a preliminary generalization of the clause on the basis of the data presented, and it will be useful to do so before looking at complex sentences.

3.2 A PRELIMINARY GENERALIZATION. With the small data set and at this level, a preliminary generalization will not require a sophisticated descriptive model. I use a notation superficially similar to that of phrase structure rules. But it models a simple relational network: the labels should be understood as mnemonic devices only. The structural relations are given in (12).

(12) a. Clause / Subject Verb [Comp1] [Comp2]
b. Comp1 / ObjectA , PrPhr
c. Comp2 / PrPhr

Square brackets in (12) indicate optional occurrence and the comma represents a simple OR relation. The morphology supplies the proper form of the pending on the morpheme class of the noun stem, and it provides a nominative ending for any noun without a syntactically determined case.

In Sullivan (1979) I show that a generalized description of Russian syllable structure defines phonological classes (e.g., stops) redundantly: they have a unique distribution across the syllable (first and third positions in an obstruent cluster) and are realized with a feature not shared phonemically with any other phonological class (oral closure). From (12) it seems at least possible that there is a similar redundancy in clause structure: distribution in the unmarked word order and a particular case (or preposition). There is scarcely sufficient structural evidence to prove this in the data presented so far, but it is a suggestive point to which I return in section V.

Now, however, I turn to the complex sentences.

4. THE STRUCTURE OF THE COMPLEX SENTENCE.

4.1 THE COMPLEX SENTENCE DATA. Russian grammar does not traditionally distinguish between different types of complex sentences. That is, (1), (2), (5), (6), (7), and (11) are all called *složnyje* 'complicated'. I repeat them here for convenience.

(1) *Grafinja pošla za širmami*$_I$ *okančivat' svoj tualet*$_A$.
(2) *Grafinja pošla okančivat' svoj tualet*$_A$ *za širmy*$_A$.
(5) *Grafinja pošla za širmy*$_A$ *otdoxnut' na minutu*$_A$.
(6) *Grafinja pošla za širmy*$_A$, *čtoby okančivat' svoj tualet*$_A$.
(7) *Grafinja pošla za širmy*$_A$, *gde ona okančivala svoj tualet*$_A$.
(11) *Grafinja okančivala svoj tualet*$_A$ *za širmami, kuda ona (uze) pošla.*

There are three types of complex sentences here. First, on morpholexical grounds (the occurrence of a subordinator like *čtoby* 'in order to' or *gde* 'where') I distinguish (6), (7), and (11) from (1), (2), and (5). Second, on syntactic grounds I distinguish (5) from (1) and (2). Each verb in (5) has its predicate complements in immediate postverbal position, unlike the verbs in (1) and (2). The predicate complements of (1) and (2), however, occur in unexpected places. The prepositional phrase complement of *okančivat'* (*za širmami*) is in Comp1 position of *pošla* in (1) and the prepositional phrase complement of *pošla* (*za širmy*) is in Comp2 position of *okančivat'*. The description I present in 4.2 is based on (5) through (11). I return to (1) and (2) in section 5.

4.2 A SECOND-LEVEL GENERALIZATION. Several observations can be made about the complex sentences in the examples. First, they consist of a main clause followed by the subordinator followed by the subordinated clausal element.[3] Second, as shown by (8) and (9), it is not possible to prepose the prepositional phrase complement of *okančivat'* or to postpose the prepositional phrase complement of *pošla* in these sentences. Third, the infinitive phrase that occurs without a subordinator in (1) and (2) is the only one which can have the anomalously placed prepositional phrase complements (cf. also endnote 2). Fourth, the infinitive phrase is the same syntactic size as a predicate (verb with nonsubject complements). It differs from a predicate sememically (it has no temporal reference), syntactically (it has no subject), and morphologically (it has no agreement).

It is now necessary to enlarge and modify the generalization given in (12). To begin with, we must add a level of structure which relates the independent clause to the clausal elements that have an overt subordinator. We must also add a third post verbal complement position to the clause. This is the unmarked position of realization for a simple infinitive. The result is given in (13).

(13) a. Sentence / Clause [subord (Clause , InfPhr)]
b. Clause / Subject Predicate
c. Predicate / Verb [Comp1] [Comp2] [Comp3]
d. Comp1 / Object$_A$, PrPhr, InfPhr
e. Comp2 / PrPhr, InfPhr
f. Comp3 / InfPhr
g. InfPhr = Predicate, in the syntactic hierarchy

Combining (13) with some semological considerations lets us account for sentences (1) and (2) and makes certain other predictions possible.

5. The description

5.1 SEMOLOGICAL CONSIDERATIONS. The structure in (13) predicts a potential output linear order for sentences (1) and (2). This linearization is given in terms of syntactic constituent names in (14) and with morphologically complete lexemes in (15).

(14) Subject Verb PrPhr (Verb Object$_A$ PrPhr)$_{InfPhr}$
(15) *Grafinja pošla za širmy*$_A$ *okančivat' svoj tualet*$_A$ *za širmami*$_P$.

Now (15) may look somewhat like a bastardized version of an *Aspects* deep structure, but it is not. It simply shows what (13) predicts in terms of linear order for the lexemes involved in (1) and (2). The two predicates provide two places for a prepositional phrase to occur. (15) is unattested, so far as I know. The same sentence would not have both *za širmy* and *za širmami* under normal circumstances. But a sentence with locus expressions that parallel them is perfectly reasonable. An example is given in (16).

(16) *Grafinja pošla v spal'nju okančivat' svoj tualet za dver'ju.*
The countess went into the bedroom to put the finishing touches on her toilette behind the door (= in private).

In (16) *pošla* has a goal expression with the accusative case (*v spal'nju*) and *okancivat'* a simple locus expression with the instrumental case (*za dver'ju*). This leaves us with two questions: (a) why do (1) and (2) have just one prepositional phrase and, (b) why does the one that occurs have the wrong case, according to (3) and (4)? I take the questions in order below. But first I turn to the mistaken belief that there are (or could be) two occurrences of *širmy* 'screen' in these sentences.

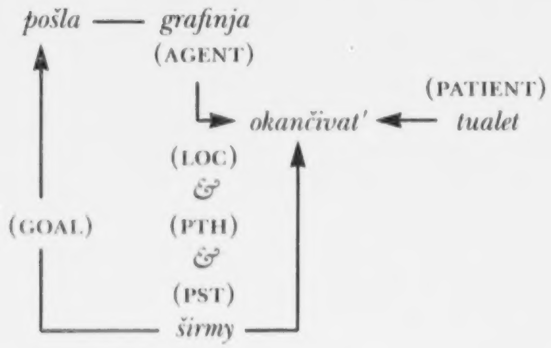
5.2 EQUI-NP DELETION. Long ago C-linguists noted that their phrase structure rules predict sentences like (17), which are completely ill formed.

(17) *I want I go home.

This situation clearly required reparation. One of the solutions put forth was a transformation called Equi-NP deletion: if the same NP occurs twice in one sentence, the second occurrence is deleted. This produced *I want* φ *go home*, which a later rule transforms into *I want to go home*. This was felt to be a reasonable solution to the problem of the nonoccurrence of (17).

It seems not to have occurred to anyone to ask why the phrase structure rules generated ill-formed sentences of this sort in the first place. The reason is simple. Chomsky limited all structures to well-formed trees. Now the *I* that *want* in (17) is the same as the *I* that *go home*. That is, the two *I*'s are identical. Now, in mathematics or logic, when you have an identity relation like a = b, what you have is not two separate things, *a* and *b*, that happen to be identical, but only one. Thus (17) actually has only one *I*. We can describe this situation by stating that the *I* is related to both verbs. But if we had only one *I* in a C-linguistic deep structure and if that *I* were related to two verbs, the structure would be a mathematical *reticulum* (= net), not a tree.[5] Thus, a second *I* had to be inserted into the deep structure with the proper indexation to

(18)



guarantee that both would refer to the same ego. In short, both indexation and Equi are artifacts of C-theory.

5.3 THE SEMOLOGY OF (15). There are three participants in (15): *grafinja* 'countess', *širmy* 'screen', and *tualet* 'toilette'. There are two activities: *pošla* 'went (somewhere) by walking' and *okančivat'* 'put the finishing touches on something'. The participants and the activities are related to each other in a single semological predication.

The details of the predication are straight forward. First, *okančivat'* is subordinated to *pošla.* Second, *tualet* is related to *okančivat'* and communicates the PATIENT function. *Grafinja* is related to both activities and communicates the AGENT function in each case. *Širmy* is also related to both activities. In each case it communicates a spatial LOCUS on a PATH POSTERIOR to itself, from the viewpoint of some external observer. In the *pošla* case, it also communicates the GOAL function, i.e., the locus defined is the endpoint of the movement communicated by *pošla.* I summarize this in (18), ignoring tense and possession.

In fact, (18) is not the semological structure of (15), which doesn't occur. I hypothesize that it is the semological structure of both (1) and (2). It is surely the simplest way of accounting for the fact that (1) and (2) simultaneously provide information concerning both predicates.

I now show how (1) and (2) are realized.

5.4 THE SYNTAX OF (1) AND (2). The sememic combination LOC & PTH & PST is always realized as the preposition *za.* In the context of GOAL, PTH is realized as the accusative case (A); otherwise it is realized as the instrumental case (I). These realizations hold wherever the prepositional phrase is realized in a clause. Normally, e.g., in (3), *za* + A is realized in Comp1 position of the *pošla* predicate and, in (4) *za* + I is realized in Comp2 position of a nonmotion predicate like *okančivat'.* Thus Comp1 position of *pošla* communicates a GOAL expression (e.g., *za* + A) and Comp2 position of *okančivat'* communicates a simple locus expression (e.g., *za* + I). If *za* + A occurs in Comp1 position of the *pošla* predicate, the syntactic position and the case redundantly comunicate GOAL. Similarly, if *za* + I occurs in Comp2 position of *okančivat'*, the syntactic position and the case redundantly communicate a simple path locus. This redundancy is normal, and the case and the linear position usually go together.

Remember that there is only one participant *širmy*. Though related to both activities, it cannot be realized in both predicates. But if we de-link the communicative functions of linear position and case, i.e., if we eliminate redundancy here, we can communicate both simple locus and goal functions at the same time. That is, the simple PATH pairing *za* + I can be realized in the *pošla* (GOAL) predicate, or the GOAL pairing *za* + A can be realized in the *okančivat'* (simple PATH) predicate. The former is (1), the latter is (2).

A pair like (1) and (2) is possible only if the two functions are realized by different cases. But such a possibility does not exist if there is a participant filling two roles but there is no difference in the cases that realize them. Sentences (1) and (2) also have such a participant.

Grafinja fulfills the agent role with respect to both verbs in (18). Since both clauses are personal and active voice, *grafinja* is the potential subject of each verb. Subjects are normally realized in first position in the clause, and they are always realized by nominative case. There are two subject positions available on the lexemic stratum, but there is only one case involved. Thus *grafinja*, unlike *širmy/širmami*, cannot be realized in either subject position equally well. In fact, describing a parallel case in English (Sullivan 1978:77–81), I predict that a participant with dual function (but no difference in case) will be realized in the first available position, assuming that all obligatory syntactic requirements have been met.

So it is here: in both (1) and (2) *grafinja* is realized as the subject of *pošla*; *okančivat'* is left without a (syntactic) subject, because its potential subject has already been realized elsewhere. This is a natural and intuitively appealing situation, and it fulfills the prediction. Here, then, is the third source of word order: dual sememic function on a single participant. It follows syntactic structure, which specifies the unmarked order, and discourse function, which specifies some marked orders. A single sememic function is normally communicated redundantly by syntactic position and morphemic case. But if a single participant has two functions, delinking position and case and eliminating the communicative redundancy allows two different word orders to appear.

5.5 A CAVEAT. I state above that (1) and (2) are equivalent in terms of the information communicated regarding *širmy* as both the goal of the countess's movement and as the place in which she will be attempting to complete her toilette. I do not mean to imply by this that (1) and (2) are in all ways equivalent. They differ in terms of their relation to information structure and to discourse context. This is an important matter, but it is beyond the scope of the present study. I say nothing about it here except to note that it may be decisive in choosing which of the two to use in a given context.

6. CONCLUSIONS

6.1 THE FINDINGS. Several very suggestive inferences can be drawn from the present study. I list them without additional discussion.

1) A reticular network description can describe a situation in which a single participant realizes dual function; it does so directly and without additional mechanisms during encoding.
2) This description also correctly predicts the functional equivalence of two sentences with different word orders and different cases.
3) The description also correctly predicts the place of realization of a single participant with the same functional relation to more than one verb.
4) The reticular description is a more efficient theoretical approach than one restricted to tree structures, because it does not need three artifacts required by the tree description (repetition of the dual function element, indexation, and Equi-NP deletion).

6.2 FURTHER SPECULATIONS. There are two more general considerations I promised to revisit: the source of linearization in a linguistic system and the question of structural redundancy.

Consider first linearization. Lamb (1966) demonstrates that it is simpler to account for the linear order of the features that realize morphemes by passing through a phonemic level than by jumping directly from morphemes to feature matrices. That is, a superficially more complex stratal organization may provide simpler and more straight-forward overall storage. Taking this to its logical conclusion, I conceive of a system organized into several strata (three to five, depending on the language and the individual). A message being encoded will be processed more or less in parallel on the several strata (cf. Dell & Reich 1977), with each stratum supplying part of the overall linearization. Not only does this account for general and particular linearization, but it would account for the types of slips of the tongue (anticipation, perseveration, and Spoonerisms) that can be observed among emes of each stratum during the encoding process.

Now consider structural redundancy. The feature/distribution redundancy observed in phonology is a long-noticed phenomenon. We may suspect that this redundancy is far from coincidental, just given what we know about biological systems and the frequency with which we find redundancy in them. However, so far as I am aware, this is the first evidence noted of redundancy on a linguistic stratum other than the phonemic, and I would appreciate any information about other such findings, published or not. I suspect, however, that they will only be noticed in relational network descriptions, which do not *a priori* limit the structures that can be built according to arbitrary mathematical considerations. Such limitations almost inevitably lead to restrictions on observation as well as description and explanation, results that we should all try to avoid in science.

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[1] Mathematical trees have nothing to do with linear order. They identify hierarchical structure only. Linear order is a C-lin imposition on the mathematical definition.

[2] Consider *Ivan poexal (v Moskve rabotat'/rabotat' v Moskvu)* 'John went to work in Moscow', i.e. that's where his permanent place of employment is. It is not that his employment, which is normally located elsewhere, has recently taken him to Moscow. That would be communicated by *Ivan poexal v Moskvu rabotat'*. Nor is it that he has left here in order to take a job in Moscow (but I don't really know whether he's working there yet). That would be *Ivan poexal rabotat' v Moskve*.

[3] There are circumstances in which the subordinator and the following clausal element may precede the main clause, but I ignore them in the interest of brevity.

[4] It is possible to simplify the relations in the predicate, i.e. in (13d–f). The result, which does not affect the matter at hand, is given in (13h–j).

(13) h. Comp1 / Object$_A$, Comp2
i. Comp2 / PrPhr, Comp3
j. Comp3 / InfPhr

[5] I am indebted to H. A. Gleason, Jr., who pointed this out to me many years ago; in mathematical terms, a tree is a degenerate reticulum.

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FUNCTIONAL SUPERPOSITION

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DEFINITION OF FUNCTIONAL SUPERPOSITION. Functional superposition is a theory of the syntactic behavior of word classes which is unique to Applicative Universal Grammar (AUG) (Shaumyan 1987). AUG claims that there is a universal syntactic structure which all languages share. This universal syntactic structure is characterized by four basic functions: predicates, terms (arguments of predicates), term modifiers, and predicate modifiers. Every word has a primary function and may also have one or more secondary functions.[1] The primary syntactic functions are

for verbs – predicate
for nouns – term
for adjectives – term modifier
for adverbs – predicate modifier

For example, the word *silk* has the primary function of term, but it also has the secondary functions of term modifier, as in *silk dress*, the secondary function of predicate modifier, as in *She dressed in silk*, and the secondary function of predicate, as in *This is silk*. A secondary function is, essentially, a function other than the word's primary function. A word may have several secondary functions but only one primary function. *Primary function* and *secondary function* must be understood behaviorally.

Functional superposition is a process by which a secondary function[2] is overlaid onto a primary function, resulting in a new, bistratal[3] function Shaumyan (1987:116). Functional superposition creates a new function which is a *combination* of the primary and secondary functions rather than being a mere change of function from the primary to a secondary function. After superposition, a word (the *superponend*) has aspects of *both* its primary *and* its secondary functions, i.e., the superponend performs the roles of *each* member of its new bistratal function (Shaumyan & Segond 1992:5). Superposition is a theory which may apply to elements of language other than words, e.g., metaphor and analogy, but only superposition's effect on words will be described here.

AN EXAMPLE OF FUNCTIONAL SUPERPOSITION. Consider the sentence:

(1) *John is a driver.*

According to AUG, in (1) *driver*, in the expression *is a driver*, has a secondary function superposed on it as the result of its being combined with the operator *is*. An operator which superposes a function on another function is called a *superposer*. While the primary function of *driver* is term, it also has the secondary function of predicate in the expression *is a driver. Driver*, in the expression *is a driver*, does not have two separate functions; it has one compound function. *Driver*, in the expression *is a driver*, functions as both term and predicate, though it does not necessarily perform each function to the same degree. *Driver*, in the expression *is a driver*, plays the role of a secondary term.[4] We can see that *driver* plays both roles simultaneously if we try to construct sentences which are equivalent in meaning to (1). The sentence

(2) *John drives.*

is not semantically equivalent to (1) because the predicate *drives* in (2) describes the action of *driving*, while the predicate *is* in (1) does not. Furthermore, *drives* in (2) does not capture the notion of *someone who drives*. A *driver* is not merely someone who has acquired certain skills and may or may not use them. Thus, there is an element of process in *is a driver*. We can say that the sentence

(3) *John is a person who drives.*

is semantically equivalent to the sentence in (1) because it captures the notion that *John* is a person with certain skills who is capable of exercising them. *Is a driver* is, therefore, semantically equivalent to the phrase *a person who drives*. The latter phrase contains the functions of term and predicate although in separate words. The comparison between (1) and (3) shows that semantic equivalence requires functional similarity between the linguistic units which are members of the equivalence, in this case, between the word *driver* and the phrase *a person who drives*. We can see that this is the case by examining how each component can be modified. Since *driver* is a term, it can be modified like a term:

(4) *John is a good driver.*

But it is not just the term function or the predicate function of *driver* which is modified. Both functions are modified. We cannot modify the predicate in (2) simply by using a term modifier:

(5) **John drives good.*

Simply modifying the predicate function of *a person who drives* from (3) with a term modifier results in an equally improper phrase:

(6) **a person who drives good*

In order to create a sentence which is semantically equivalent to (4), we must modify the *predicate function* in *a person who drives*:

(7) *John is a person who drives well.*

(7) shows us that it is the predicate (the process of *driving*) which is modified and which, in turn, modifies a term. Since the sentence in (7) is semantically equivalent to the sentence in (3), we can clearly see that functional superposition does, indeed, involve a new, combined function, a *dual*, rather than separate functions. Notice that simply modifying the term (the notion of person) in (4)

(8) *John is a good person who drives.*

does not result in a sentence which is equivalent to (4).

Every superposition assumes a *superposer*, i.e., some formal device which creates the superposition.[5] Superposers are often sound sequences but, being signs, superposers are not restricted to being sound sequences. For example, in some languages, like English or Chinese, word order can be a superposer. Suffixes are common superposers in many languages.

FUNCTIONAL SUPERPOSITION COMPARED TO THE TRADITIONAL VIEW OF PARTS OF SPEECH. The theory of superposition is a striking departure from the traditional notion of parts of speech. To emphasize the difference, I would like to examine an example of the traditional notion taken from Pinker's *The Language Instinct* (1994:133). Pinker examines the phrase *Yugoslavia report*. He claims that a typical grade school grammar teacher would describe *Yugoslavia*, in the example phrase, as an adjective because it modifies *report*. Pinker disagrees, preferring to see the phrase *Yugoslavia report* as a compound noun rather than a phrase composed of an adjective and a noun:

> In English, a compound noun is often spelled with a hyphen or by running its two words together, but it can also be spelled with a space between the two components as if they were still separate words. This confused your grammar teacher into telling you that in *Yugoslavia report*, 'Yugoslavia' is an adjective. To see that this can't be right, just try comparing it to a real adjective like interesting. You can say *This report seems interesting* but not *This report seems Yugoslavia!* (Pinker 1995:133)

Aside from the questionable reference to spelling as an indicator of word function, the important notion in the quotation above is that the word *interesting* is a *real adjective.* I do not question that *interesting* operates as a term modifier; I question whether there is such a thing as a *real adjective.* Pinker only briefly describes grammatical categories. He says:

> A part of speech…is not a kind of meaning; it is a kind of token that obeys certain formal rules, like a chess piece or a poker chip. A noun, for example, is simply a word which does nouny things; it is the kind of word that comes after an article, can have a *'s* stuck onto it, and so on. (Pinker 1995:106)

While Pinker talks in 'functional' terms ('a word which does nouny things'), he says that a part of speech is a kind of token. Generative Transformational Grammar (GTG), the tradition within which Pinker operates, sees a part of speech as a thing or, better, as the state of a thing. A noun is a noun because it acts like a noun ('does nouny things'). This does not tell us how nouns act or why they act that way. Pinker simply says that if we knew how nouns acted, we could identify nouns, because we would then know what nouns were. Whatever a noun is, it is rigidly circumscribed. Pinker's analysis of the phrase *Yugoslavia report* indicates that even if a noun appears to be acting like another type of word (the kind of behavior that befuddled Pinker's poor old grammar teacher), a noun is still a noun. Ergo, *Yugoslavia report* consists of two nouns. Pinker says that a noun is a word which 'does nouny things' but actually means that a word 'does nouny things' because it is a noun. GTG's *noun* is the name for a word type which has certain, arbitrary attributes, one of which is a certain type of behavior. Words are not defined in terms of behavior; behaviors are defined in terms of word types.[6] Declaring *Yugoslavia report* to be a compound noun is nothing more than an attempt to salvage the notion that *noun*, as a state, is invariant, while still noting the obvious fact that *Yugoslavia* modifies *report.* In order to see a part of speech as a state, Pinker must say that if *w* is *P*, then *w* does what *P* does, where *w* is some word and *P* is a part of speech. I refer to this as an *is:does relation.* Notice that Pinker does not say that if *w* does what *P* does then *w* is *P*. In fact, he criticizes this very notion when it is raised by his grammar teacher. Pinker's notion of a part of speech is as a fixed unit, or, as he calls it, a *token.*

In his telling simile of a word and a chess piece Pinker has unconsciously mentioned what is wrong with the part-of-speech-as-state notion. While it is the case that, *under most circumstances,* a chess piece plays a particular role, it is not *always* the case. If a player, say white, were to move a pawn to black's end of the board, white could promote the pawn to a queen. The pawn would still look like a pawn but would act like a queen. In the Japanese variant of chess called *shogi,* many types of pieces can get promoted. Promotion results in several different types of behavior. In European chess, how many queens does a player have at a given point during the game? How many queens does the player *potentially* have? These questions can be answered only situationally rather than absolutely.

Pinker's chess piece analogy shows that, for him, word types are simple, hard-edged blocks. There may be advantages to the hard-edged view, especially if one wishes to perform certain types of analysis which presume such a view,[7] but the 'hard-edged' view does not mirror reality very well. In AUG, functions do not have hard-edges. Words are thought of in functional terms;[8] hence the adjective *functional* in *functional superposition.* AUG says that if *x* does *y* then *x* is *F,* where *x* is some word, *y* is some linguistic behavior, and *F* is the function name given to *y.* I refer to this type of relation as a *does:is relation.* If we look at a description of language as a description of linguistic behavior rather than as a description of linguistic states and if we see that functions are not exclusive to any particular word type, we will see that a word, when the occasion demands, can have a combination of functions. Since Pinker has used an analogy to explain his notion of parts of speech, it is appropriate that I use an analogy to explain *function.*

Function may be thought of as a job description. A job description is the description of an employee's *typical* role in an enterprise. If employee *X* has the job of preparing reports, secretary *Y,* another employee with a different job description, may be assigned to help *X* prepare the reports. Normally, *X* and *Y* perform the job of report preparation together with each of them performing different, but not necessarily completely or situationally discrete portions of the job. If *Y* is unavailable, *X* may have to perform all the requirements of the job, such as typing the report, which may normally be *Y*'s job. In the case of *Y*'s absence, *X* performs the roles of *both X* and *Y* in order to complete the job. At any moment, it may be impossible to say whether *X* is performing *X*'s role or *Y*'s role because *X* is performing both simultaneously. Taking Pinker's *Yugoslavia report* example, we see that Pinker is correct in saying that *Yugoslavia* is a term (noun) but that he is incorrect in saying that it is *always* a term (noun). His grammar teacher was correct in saying that *Yugoslavia* modifies report. In some languages, word order can functionally superpose words.

In this case, *Yugoslavia* has had the secondary function of term modifier superposed on its primary function of term by its position. In another context, *Yugoslavia* may continue to perform its primary function exclusively, as in the sentence:

(9) *Yugoslavia was a nice country before the war.*

(9) shows us that functional superposition is contextually sensitive, i.e., it occurs in certain contexts but not others. Functional superposition requires a superposer. If no superposer is present, there is no functional superposition. Functional superposition applies only to its specific context. In the following example:

(10) *According to the Yugoslavia report, Yugoslavia was a nice country before the war.*

the first instance of *Yugoslavia* is superposed (by word order) but the second instance performs only its primary function. Pinker's phrase *Yugoslavia report* is strained. Normally, *Yugoslavia* would be replaced by a term modifier, like *Yugoslavian* or the phrase *about Yugoslavia.* When Pinker compares *Yugoslavia* with a 'real adjective' like *interesting*, the strain shows. We can certainly say *The report was Yugoslavian* or *The report was about Yugoslavia.*

FUNCTIONAL SUPERPOSITION AND TRANSPOSITION. AUG does not claim that superposition occurs every time that a word acquires a new function. AUG has another operation which changes word function, called *transposition*, which is related to but not identical with functional superposition.

DEFINITION OF TRANSPOSITION. *Transposition* is a purely relational operation which applies a *transposer* to a *transponend*, resulting in some change the *transponend*'s primary function (Shaumyan 1987:113). Functional transposition can change the primary function of a transponend from one functional category to a different functional category (*Yugoslavia* becomes *Yugoslavian*) or can change the transponend into a different word in the same functional category as the word which was transposed (*village* becomes *villager*). While transposition and superposition both alter word functions, the result of each operation is different. The result of superposition is a *dual*, i.e., a new, bistratal function consisting of a secondary function imposed upon a primary function. The result of a transposition may be called, by analogy to a *dual*, a *single*, i.e., the transponend has acquired a new primary function only.[9] If we add the suffix *-ier* to the stem of the verb *carry*, the resultant *carrier* has a new primary function (term). *Gold* can be transposed to a term modifier by the suffix *-en* (*golden*) or it can be superposed to a term modifier through linear position (*John received a gold watch*). Because transposition and superposition are closely related, it is not always obvious which operation takes place. For example, the suffix *-er* can be either a transposer or a superposer. Adding *-er* to *walk* results in the term *walker* (*Because of his injuries, John needed a walker*). Adding the same suffix to a verb like *blend* may result in either a transposition (*John bought a new blender*) or a superposition (*John got a job as a paint blender*). There are some words, derived from verbs, to *cut : cut, cutting*, which are so commonly used as nouns that we are justified in saying that they are transposed, while other words, derived from nouns, *hammer : to hammer, screw : to screw, nail : to nail*, which show their superposition.

THE LAW OF THE INVERSE RELATION BETWEEN THE CONTENT AND RANGE OF AN ELEMENT. The law of the Inverse Relation between the Content and Range of an Element says:

> The larger the number of features of an element the smaller the number of its occurrences, and, inversely, the larger the number of its occurrences the smaller the number of its features. (Shaumyan & Segond 1993:4)

Superposition results in an element with a larger number of features than it had prior to the superposition. The word now has a *dual* function while previously it had a *single* function. The Law predicts that superposition occurs less frequently than transposition because transposition does not result in the increase of the number of features. Depending on the context, any sign may be either a transposer or a superposer. Transposition results in the change of a feature. *Gold* is transposed into *golden*. *Golden* has a primary function of term modifier. It can occur anywhere its primary function would be appropriate. When *gold* is superposed into a term modifier, as in *John received a gold watch*, *gold*, **as the result of a superposition**, can occur only within the context of the superposition. AUG defines a syntactic context as a type of syntactic configuration. A specific example of functional superposition can occur only in a specific context. Transposition is not limited to specific contexts (Shaumyan & Segond 1993:4).

The Law informs us that the superposition of *driver* in (1) must been seen in context. The superposer may be the construction *is a* rather than *is*, i.e., the predicate *to be* is not, per se, the superposer; it is the predicate *to be* **in a certain context** (here accompanied by the word *a*) which is the superposer. The form *x is a y* is different from the form *x is the y* in meaning. *X is a y* is a categorical statement; *x is the y* is a statement of identity (*John is the driver*).[10] Categorical statements may be contexts in which the predicate *to be* is a superposer, while the same verb in identity statements may not act as superposers. More work needs to be done.

Functional transposition and functional superposition are observable phenomena. My current project to measure functional superposition with my theory of importance (Sypniewski 1994) has shown some preliminary promise in producing results which may permit the computer analysis of functional superposition.

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[1] While Shaumyan (1987: 116–17) describes *functions* in terms of syntax, the notion of functional superposition is general enough to encompass other types of linguistic features.

[2] An expression may have more than one additional function superposed upon it. Such functions are referred to as tertiary, quaternary, etc. functions. For simplicity's sake, this paper will only consider secondary functions

[3] The formal definition of *superposition* is

> Let E be an expression of type x, and let E take on type y over type x. Then E shall be said to belong to type z such that z is stratified into y superposed onto x. Type z is represented by the formula $<x : y>$, where colon (:) indicates the stratification of type z into y superposed on x, enclosed in angle brackets. The right part of the formula indicates the primary type of E, and its left part indicates the secondary type of E. (Shaumyan & Segond 1993:8).

[4] A secondary term is one of three types of terms in AUG: primary, secondary, and tertiary. A secondary term is similar to but not identical with a direct object. The terminology *secondary term* reminds us that AUG concerns itself with word functions.

[5] The formal definition of superposer is:

> An operator R of type $O\ x<y:x>$ shall be called a superposer. (Shaumyan & Segond 1993:8).

[6] This description would be familiar to Aristotle.

[7] GTG assumes that a logico-mathematical model of language is satisfactory and that all logical or mathematical operations are appropriate for the analysis of language. Since both logic (at least traditionally) and mathematics see the world as being made of discrete entities, GTG must see linguistic phenomenon as hard-edged in order to use the formalisms and operations it wishes to use. I think this is a serious error. Interestingly, GTG is based on first order logic, i.e., the logic of propositions. AUG uses second order logic (the logic of functions) for its formalism.

[8] When AUG speaks of *function*, it does not mean function in the set theoretic sense, but rather in the sense of *operation* (Shaumyan & Segond 1992).

[9] In the case of *village : villager, villager* is said to have acquired a new primary function because it has acquired a new semantic meaning.

[10] It is interesting to speculate whether the current discussion of superposition would apply if the sentence in (1) were *John is a driver.* For the purposes of determining whether transposition or superposition has occurred, the context *is a* and *is the* may be, and in this case are, different.

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EXTERNAL CONTROL IN CAUSATIVES OF ENGLISH AND JAPANESE

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1. INTRODUCTION*. The notion of 'control' has been discussed in terms of 'deliberateness' of the causation or action independently by Givón (1975d, 1979) and Comrie (1981). However, their analyses do not clearly explain the difference between intentionality of the agent (causee) and the causer's control for the resulting action (of the causee).

Givón (1975) defines the term 'control' as 'deliberate causation'. He states (1975:62):

> An incidental (nonintended) act on the part of someone may INCIDENTALLY 'cause' an INTENDED act by another individual, but the intent or CONTROL of the resulting proposition remains vested in the OBJECT of 'cause'.

Thus, in his definition, the verb *cause* is a noncontrol causative verb since it could indicate an incidental cause as in (1)a. (Givón 1975:62).

(1) a. John accidentally caused Mary to pick up her books and run.
b. *John accidentally made Mary pick up her books and run.
c. *John accidentally had Mary pick up her books and run.

In (1)a, the predicate in the embedded clause, *pick up the books and run*, indicates that *Mary* has control over the action, since John did not cause Mary's action deliberately. On the other hand, (2)b and (2)c below indicate John's deliberateness and that he has control over Mary's action.

(2) a. *John deliberately caused Mary to do the dishes.
b. John deliberately made Mary do the dishes.
c. John deliberately had Mary do the dishes. (Givón 1975:62)

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Accordingly, Givón claims that DELIBERATENESS and ACTION are not synonymous, and proposes the following two control principles:

(3) a. An accidental [Pc], i.e., an event in which the subject is *not in control,* may be the cause of either an act or a state. If the former is the case, then the subject of [Pe] has control.
b. Nominals in causation chains are *hierarchized,* and only one of them may have control. The object nominal, that is, the prominent nominal of [Pe], may assume control only if the subject nominal, i.e., the *agent* of [Pc], has no control.
([Pc] = a cause proposition; [Pe]=an effect proposition. (Givón 1975:63)

In Givón's definition of control, 'control' is assigned according to the type of cause and the predicate in [Pe].

Comrie (1981) discusses the term 'control' in the causative situation by the causee also in terms of 'deliberateness'. He argues that the relations among agent, force, instrument, and patient are not a set of discrete semantic relations, but rather a continnum. He explains that the labels of the semantic roles represent different points along this continuum, and the continuum as a whole can be regarded as a continuum of control. Thus, according to Comrie, example (4)a has no grammatical indication of the degree of control, while (4)b indicates 'full control' of the agent with the adverb *deliberately.* In (4)c, the phrase *owing to our carelessness* indicates that there is some responsibility for our falling to the ground. Thus, it indicates potential control. The passive construction (4)d indicates no control by the one who fell, namely *we.*

(4) a. No indication of control: We fell to the ground.
b. Full control: We deliberately fell to the ground.
c. Potential control: We fell owing to our carelessness.
d. No control: We were pushed down.

Comrie also discusses the degree of control indicated by causative constructions. He explains that, with the Japanese causatives, the degree of control retained by the causee is different depending on the case used to encode the semantic role as in (5).

In Comrie's explanation, the difference is that (5)a assigns 'minimal control' to *Jiroo,* while (5)b indicates that *Jiroo* may have retained 'greater control'. Thus, (5)a can correspond to 'Taroo forced Jiroo to go', while (5)b corresponds to 'Taroo got Jiroo to go, persuaded him to go, got him to go by asking nicely' and so on.

(5)	a. Taroo	ga	Jiroo	*o*	ik-*ase*-ta.
		NOM		PATIENT	GO-CAUS-PAST
	b. Taroo	ga	Jiroo	*ni* i	k-*ase*-ta.
				AGENT	

'Troo *caused* Jiroo to go'.

(Comrie 1981:54, notations changed and glosses added by the author.)

We have seen that both Givón and Comrie define the term 'control' in terms of deliberateness and seem to deal with the actor's intentionality and capability to do the action as the part of the notion of 'control'. In such analyses, transitivity and the types of adverbs used in the sentences are also to be taken into consideration, and this makes the analysis quite complicated.

In this paper, I will introduce a new notion, 'external control', which distinguishes the 'control' (a) on the part of the agent doing the action from (b) the control that triggers an agent to do an action, as in causatives, and from (c) the types in which an actor has no control over an action or an event, as in passives. We will see that the notion of 'intentionality' and 'deliberateness' should be dealt with separately from external control since indication of the intentionality involves the nature of a verb (whether it is transitive or intransitive and whether it is active or stative) and deliberateness involves other linguistic expressions such as adverbs like *deliberately*, *intentionally*, *carelessly* and *accidentally*.

2. EXTERNAL CONTROL

2.1. EXTERNAL CONTROL IN ENGLISH. The notion of control discussed in Givón and Comrie is related to a cause and its resultant effect: how the resultant effect is brought about and whether the agent's intentionality or capability for performing an action is involved. In this paper, the focus of the discussion is on the subject of the matrix sentence in terms of possession of 'control'. I will use the term 'external control' to refer to a controlling power that the referent of the subject may have. The notion of 'external control' has nothing to do with deliberateness/intentionality of either the agent of an action or the causer. The term is defined in an extremely narrow sense as in (6):

(6) External Control: It should be said that there is 'external control' when the referent of the subject has control/power on the resultant effect. Conversely, it should be said that there is 'no external control' when the referent of the subject has no control/power on the resultant effect.

Thus, the sentences in (7) are not examples of 'external control' in the sense of (6), since all the sentences denote that the agent of the action of breaking the glass is the referent of the subject and the direct causer of the result, whether or not it was done accidentally, carelessly, or deliberately.

(7) a. Bill deliberately broke the glass.
b. Bill accidentaly stepped on the glass and broke it.
c. Bill carelessly dropped the glass on the concrete and broke it.

Examples in (8) illustrate our definition of 'external control'.

(8) a. John forced his son to do his homework.
b. John made his son stay home.
c. John let his dog go out.
d. John caused Bill to quit the university and work at a factory.
e. John was told by his wife not to spend money any more.
(and he did not do that/but he still did).

The resultant effect of (8)a is that *John's son* did his homework. The referent of the subject *John* is not the agent of the action of doing the homework. The sentence does not indicate John's intentionality or capability for doing the homework either. It indicates a situation where John's son did his homework because of John's order, or some sort of physical or psychological force, or manipulation which his son could not resist. (8)b also indicates that John's son stayed home because of John's order or some other sort of manipulation, i.e., 'external control'. (8)c indicates that John gave a permission to his dog to go out. That is, John had controlling power (i.e., giving a permission) over his dog's going out. In these examples, we see, as Comrie claims, that there is a degree of control between full control and potential control, depending on the type of control such as force, order, and permission. (8)d also indicates that John had some control or power as a trigger for Bill's quitting the university and working at a factory. On the other hand, (8)e indicates no control on the part of John, the referent of the subject, over his wife's telling him not to spend money.

We have seen that the referent of the subjects of all the sentences in (8) have either 'external control' or 'no external control'. The degree of 'external control' assigned to the referent of the subject observed in the sentences between (8a) and (8)d can be illustrated as in the scale in (9).

In English, the verbs such as *force, make, let,* and *cause* indicate the degree of external control. Thus, it can be said that the referent of the subject of a causative construction always retains some degree of external control such as a 'forceful manipulation' denoted by *force*, an 'active manipulation' denoted

(9) The scale of external control.

Ø ⟶

no control   potential control   ⟶   full control

⟵ [+ external control] ⟶

by *make*, 'permission' and 'nonintervention' denoted by *let*, and a 'minimal control' indicated by *cause*.[1] On the other hand, the referent of the subject in the passive construction has no external control, so that it cannot help but receive the action of the agent or an event without being able to prevent it. The referent of the subject of the passives is totally in the receiving role in terms of the agent's action or an event.

2.2. External control in Japanese. The notion of external control is also applicable to Japanese causatives and passives in exactly the same way as in English. The only difference between English and Japanese is that Japanese does not have independent verbs which indicate external control such as *force*, *make*, *let*, and *cause*, which indicate the relative degree of external control in English. The Japanese causatives are marked by the suffix *-(s)ase*, which broadly can mean 'force' as in (10)a, 'make' as in (10)b, 'let' in the sense of giving a permission as in (10)c, 'let' in the sense of 'noninterference/nonintervention' as in (10)d. *Cause* as an indication of an ambiguous causation is exemplified in (10)e.

(10) a.

Tanaka-san	wa	musuko	ni	muriyari
Mr/Ms. Tanaka	TOPIC	son	AGENT	forcefully

shukudai	o	s-*ase*-ta.
homework	ACC	do-CAUS-PAST

'Mr/Ms.Tanaka *forced* his/her son to do his homework'.

b. Tanaka-san wa musuko ni shukudai o s-*ase*-ta.
'Mr/Ms. Tanaka *made* his/her son do his homework'.

c.

Musuko	ga	indo	e	ik-itai	to	iu
son	NOM	India	to	go-want	QUOTE	say

node,	Tanaka-san	wa	ik-*ase*-te	yat-ta.
so			go-causing	give-PAST

'Mr/Ms. Tanaka let his/her son go to India because he said he wanted to go'.

d.

Yamada-san wa	itsumo	kodomo	ni	sukina-koto	o
	always	child	DAT	favorite-thing	ACC

s-*ase*-te	ir-u	rashii.
do-CAUS	be-PRES	seem

'Mr./Ms. Yamada seems to *let* his/her child do as he wants to do'.

e.

Sono nioi	ga	Hiroshi	ni	mukashi	no	koto	o
that smell	NOM		DAT	oldtimes	of	event	ACC

omoidas-*ase*-ta.
recall-CAUS-PAST

'The smell caused Hiroshi to think back to the old days'.

The degree of 'external control' indicated by the Japanese causative suffix *-(s)ase* is from full control such as 'force' to minimal control such as 'non-intervention against one's wish' and just 'a trigger' for one's action or a situation.

We will examine cases like (10)e where the suffix *-(s)ase* can mean 'cause' as a trigger for a resulting effect when the causer is inanimate. The sentences in (11) are additional examples in which the causer is inanimate and the causee is animate.

(11) a.

Utsukushii	ongaku	wa	hitobito	no	kokoro
beautiful	music	TOP	people	of	heart

o	nagom-*ase*-ru.
ACC	comfort-CAUS-PRES

'The beautiful music *causes* people to feel comforted/ The beautiful music comforts people'.

b.

Kodomo	no	shi	ga	ryooshin	o	kanashim-*ase*-ta.
child	of	death	NOM	parents	ACC	grieve-CAUS-PAST

'The child's death *caused* his parents to grieve'.

When the causer is animate as in (12), the degree of external control seems to increase even with inanimate objects such as *hana* 'flowers' and *kudamono* 'fruit'.

(12) a. Tomoko wa hana o sak-*ase*-ru no ga joozu da.
flower ACC bloom-CAUS-PRES COMP NOM good be

'Tomoko is good at causing the flowers to bloom'.

b. (Watashi wa) ukkari s-ite kudamono o kusar-*ase*-te shimat-ta.
careless doing fruit ACC rot-CAUS finish-PAST

'I carelessly caused the fruits to get rotten (and I regret it)'.

When the causer (the subject) and the causee (the object) are both inanimate, the degree of external control decreases to the minimal point on the scale of external control as seen in (13).

(13) a. Gakusei undoo ga ano kuni o minshuka
student movement NOM that country ACC democracy

ni mukete henkas-*ase*-ta.
toward change-CAUS-PAST

'The student movement caused the country to change toward democracy'.

b. Juu-shakai ni natte iku koto ga yononaka o
gun-society become going COMP NOM world ACC

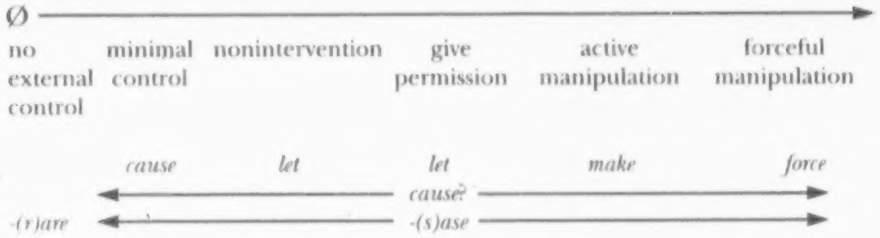
fuan-ni s-*ase*-te iru.
anxiety-ADV do-CAUS be

'The fact that more people have guns and use them more easily causes the world to become unsafe'.

As observed in the above examples (10)–(13), the degree of external control indicated by *-(s)ase* can be 'minimal cause' to 'full control' as illustrated in (14).

2.3. ANIMACY AND THE DEGREE OF EXTERNAL CONTROL: There seems to be some degree in the span of 'minimal external control' which involves either inanimate causer or causee, depending on which is inanimate, the causer or the causee, or both. In the case where the causer is animate and the causee is inanimate as in (12), the degree of external control is the highest on the scale of minimal external control. The second degree of minimal external control assigned to the referent of the subject seems to be the case in which the causer is inanimate and the causee is animate as in (11). When both the causer and

(14) The scale of external control:



the causee are inanimate, the degree of minimal external control becomes minimal as in (13).

This analysis seems to be applicable to the English causative sentences with the verb *cause* in the interpretations of the sentences as in (15).

(15) a. John caused Nancy to sing a song.
a'. John caused Nancy to be sullen.
b. John caused the place to be destroyed.
c. A sudden gust of wind caused Mary to rush into the house.
c'. A sudden gust of wind caused Mary to lose her balance.
d.??A sudden gust of wind caused the beam on the pole to hang onto the pole tightly.
d'. ?A sudden gust of wind caused the beam on the pole to lose its balance.

The English examples in (15) also indicate some difference in the degree of external control when the causer and/or the causee is inanimate as in (15)c to (15)d'. The differences seem to be similar to those observed in the Japanese examples in (10) to (13). Although it would be naive to conclude that the degree of minimal external control is determined by inanimacy of the causer and/or causee, certainly there seems to be some correlation.

Givón argues that the grammaticality of a causative sentence is largely dependent on whether or not it is an intended causation, which is indicated by a causative verb and the predicate in the embedded clause, as in (16) and (17). (Examples are from Givón 1975:62.)

(16) a. ?John deliberately caused Mary to lose her balance.
b. John deliberately made Mary lose her balance.

(17) a. John accidentally caused Mary to pick up her books.
b. *John deliberately made Mary pick up her books.

Givón explains the degree of acceptability of these sentences between *cause* and *make* as follows:

> (18) ...only CAUSE allows an unintended (or 'incidental') result that involves an ACTIVE predication, i.e., a proposition in which another nominal IS IN CONTROL.

One may argue that the degree of external control may also relate to the types of predicates involved in the causative situations. However, it would be better to analyze the degree of 'intent', 'power', or 'control' of an agent indicated by the predicate separately from the notion of external control assigned to the causer.

2.3. EXTERNAL CONTROL IN PASSIVES. As has been mentioned earlier, the referent of the subject in the passives does not have any external control. We may be able to use the term 'control' in this case in the same way that Givón and Comrie use it, since the referent of the subject of the passive construction may not be an external entity. However, in order to make the notion of external control able to deal with the linguistic phenomena in a universal perspective, the term must be used: A language like Japanese can generate a passive construction out of a sentence with an intransitive verb as in (19)b. The Japanese passive sentences generated from the sentences with an intransitive verb, as in (19)b, and with a transitive verb, as in (20)b and d, can have an extra NP. Notice that both (19)b and (20)b and d have the extra NP, *watashi* and *Tanaka-san*, respectively. The underlined NP is the extra NP in the passives.

(19)	a.	Ame	ga	fur-ta.	'It rained'.	
		rain	NOM	fall-PAST		

b.	*Watashi*	wa	ame	ni	fur-*are*-ta.
	I	NOM	rain	DAT	fall-PASSIVE-PAST

(20)	a. Sensee	ga	kodomo	o	nagur-ta.	'The teacher beat the child'.
	teacher	NOM	child	ACC	beat-PAST	

b.	*Tanaka-san*	wa	sensee	ni	kodomo	o	nagur-*are*-ta.
		TOP		AGENT		ACC	beat-PASS

c.	Sensee	ga	kodomo	o	home-ta.	'The teacher praised
	teacher	NOM	child	ACC	praise-PAST	the child'.

d. Tanaka-san	wa	sensee	ni	kodomo	o	homer-*are*-ta.
	TOP		AGENT		ACC	PASS

The passive sentence (19)b indicates that the extra NP, *watashi*, has no control over the fact that it rained and, as a result, that possibly *watashi* got wet. Similarly, the passive sentences (20)b and (20)d indicate that *Tanaka-san* has no control over what the teacher has done to or for his/her child. In the case of (20)b the sentence indicates a suffering in the part of *Tanaka*, the referent of the subject (who can also be considered the topic of the sentence), because the suffix *-(r)are* indicates that the referent of the subject has no control over the situation and the situation in this case is abusive to his/her child. On the other hand, the passive sentence (20)d indicates the feeling of happiness on the part of Tanaka because what the teacher did was to praise his/her child. The suffix *-(r)are* only indicates that the referent of the subject does not have control over the situation at all. Therefore, the *-(r)are* in Japanese is at zero control on the scale of External Control illustrated in (14).

3. SUMMARY. In this paper, I have introduced the term 'external control' to distinguish it from 'control' indicated by a lexicon or by a predicate. The notion of external control simply indicates whether the referent of the subject in a causative or a passive situation has control over the situation. We also have seen that there is a degree of external control between 'zero' to 'force', the full external control. Between them are the 'minimal control', 'nonintervention', 'permission', 'active manipulation'. We also observed that there may be some degree of external control among 'minimal control' such as the 'least control', 'medium control', and 'more control than medium'. Further research will verify that the term 'external control' can explicate the passive and causative expressions in other languages, and it may be that there is some degree of external control even in the passive situations.

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[1] The verb *cause* can indicate more degree of control than minimal control although it may not indicate full control such as forceful control since, as Givón has demonstrated, the verb does not indicate 'intentionality'. Deeper analysis is required to determine the degree of external control that the verb *cause* indicates with various adverbs and types of predicate in embedded clauses.

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GRAMMATICALIZATION IN MAYORUNA

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1. Introduction. *Grammaticalization* is a term that has been used to describe a process that leads to various historical changes in languages. Hopper (1991:17) says that '[t]he earliest known use of the word *grammaticalization* was apparently by Meillet, who defined it as "the attribution of a grammatical character to a previously autonomous word"' (1912:131). Givón (1984:19) defines *grammaticalization* as 'the process by which grammatical morphology develops out of lexical items'. In Mayoruna (see below) there is a set of grammatical forms that may have started as lexical verbs and through this process have since become suffixes.

Mayoruna. Mayoruna is a Panoan language spoken in Peru and Brazil. The Panoan languages are mainly found in Peru, Bolivia, and Brazil. The Mayoruna of this paper is spoken in the eastern part of Peru along the Yaquerana river and its tributaries by about 450 people. Kneeland says that there are also Mayoruna in Brazil along the Yavarí river (Kneeland 1979, Prologo). Grimes (1988) says that there are only about 250 Mayoruna speakers all together. Mayoruna is an ergative language, with fairly flexible word order, but with a preference for verb-final sentences. For many of its suffixes there are two forms that have the same meaning. One form is appended to transitive verbs, and the other to intransitive verbs (indicated by the abbreviations s.t. and s.i. respectively). All data for this paper are from Kneeland (1979), and her orthography is used. Kneeland's work is in Spanish, and the translation of the relevant parts to English is mine.

2. Suffixes. Mayoruna has thirteen suffixes that can be appended to verbs in which the action of the verb is performed at some point during the action of the suffix. The actions in some of the suffixes occur simultaneously with that of the verb, while in others the actions occur sequentially. In either case, two actions are coded in a single clause, which implies that there is semantically only one event being described.

Examples (1)–(3) illustrate the kinds of suffixes in which the action of the verb is performed at the same time as the action of the suffix. The suffixes of example (1) are used when the subject of the sentence comes to a point of reference (usually the location of the speech act or speaker) doing the action of the verb.

(1) a. -bë 'to come doing (something)' (s.t.)
b. -cho 'to come doing (something)' (s.i.)

c. mani pe-bë-o[c]-[ë]mbi
banana eat-to.come.doing-REC.PST-ERG.1.SUBJ
'I came eating a banana' (I was eating the banana when I came)

d. bacuëbo mamën-cho-[o]sh
children laugh-to.come.doing-REC.PST
'the children came laughing' (they were laughing when they came)

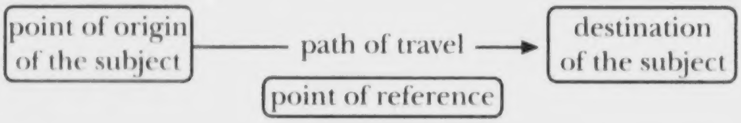
The suffixes of example (2) are used when the subject of the sentence goes from a point of reference doing the action of the verb.

(2) a. -ban 'to go doing (something)' (s.t.)
b. -nid 'to go doing (something)' (s.i.)

c. mani pe-ban-osh
banana eat-to.go.doing-REC.PST
'he went eating bananas' (he was eating bananas when he left)

d. bacuëbo mamën-nid-ec
children laugh-to.go.doing-PRESENT
'the children are going laughing' (they are laughing as they leave)

The suffixes of the examples given in (3)c and d are used when the subject of the sentence started somewhere away from the point of reference, and was doing the action of the verb when he passed by on his way to a different location. Here is a diagram presenting the relative locations of the participants:



(3) a. -ben 'to do (something) passing by' or 'to do (something) for the first time', 'the beginning of a process' (s.t.)

b. -cuen 'to do (something) passing by' or 'to do (something) for the first time', 'the beginning of a process' (s.i.)
c. mani pe-ben-osh
bananas eat-do.passing.by-REC.PST
'he ate bananas passing by' (maybe 'he was eating bananas as he passed by')

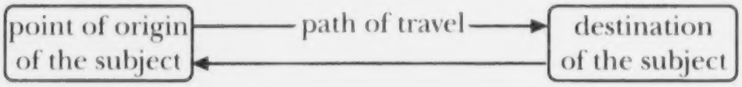
d. onque-cuen-osh
talk-do.passing.by-REC.PST
'he talked passing by' (maybe 'he was talking as he passed by')

(3)e is an example of the suffix being used with its other meaning.

e. bacuë-mpi mamën-cuen-osh
baby-DIMINUTIVE smile-do.for.the.first.time-REC.PST
'the infant smiled for the first time'

In the remaining suffixes, the action of the suffix takes place both before and after the action encoded by the verb. As was suggested by Doris Payne (personal communication) it may be better to describe the action of the suffix as being punctuated by the action of the verb. Examples of this kind of suffix are shown in (4)–(8).

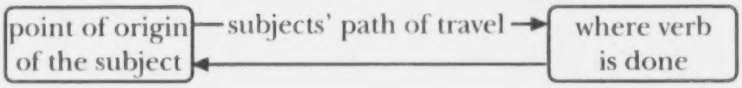
The suffix in example (4) is used when the subject came from some distant location, did the action of the verb at the location of the point of reference (the speaker), and returned to his point of origin. A diagram of the relative locations of the participants and the path of travel is



(4) a. -uan 'to come (do something) and to go'

b. mani pe-uan-osh
banana eat-to.come.and.go-REC.PST
'he came, ate bananas, and left' (maybe 'he punctuated his coming and going with eating bananas')

The suffix in (5) is used when the subject goes to some distant location from the point of reference, does the action (of the verb) at this location, and returns to his point of origin (where the speaker is). A diagram representing the relative locations of the participants and the path of travel can be shown as:



(5) a. -tan 'to go (do something) and to return'

b. con daués ised-tan-nu
my older brother in law visit-to go and return-INTENT
'I intend to visit my older brother-in-law and return'.

The suffix in example (6) is used when the subject either comes or goes to a location to perform the action of the verb.

(6) a. -tuid 'to stop on the road (or on arrival at the destination) to do something, that will be on coming or going' or 'to carry (bring) to the destination'

b. opa-n shëcten shëd-tuid-osh
dog-ERG 'sajino' smell-to stop on the road to do-REC.PST

'the dog stopped on the road (while coming or going) to smell the "sajino"'

c. pachid codoca-tuid-ec
'yuca' cook-to stop on the road to do-PRESENT

'she will cook 'yuca' when she arrives (home)' (maybe 'she carried yuca [home] to cook when she arrives [there]').

When /-tuid/ is used on the verb 'to see' it can either mean 'to see in (on) the road'

d. abucquit is-tuid-osh
'choro' monkey see-to stop on the road to do-REC.PST
'he saw "choro" monkeys on the road'.

or 'to find'

e. con chështempi is-tuid-o[c]-[ë]mbi
my knife see-to stop on the road to do-REC.PST-ERG.1.SUBJ
'I found my knife (while coming)'.

The suffixes in (7) are used when the subject travels on the road, stops to do something, and later comes to the point of reference.

(7) a. -bëtsen 'to stop on the road to do something and later to come' (s.t.)
b. -cuëtsen 'to stop on the road to do something and later to come' (s.i.)

c. con cu ised-bëtsen-o[c]-[ë]mbi
my uncle visit-stop...to do and later come-REC.PST-ERG.1.SUBJ
'I stopped on the road to visit my uncle and later came'.

d. onque-cuëtsen-osh
talk-to stop on the road to do and later come-REC.PST
'he stopped on the road to talk, and later came'.

The suffixes in (8) are used like /-bëtsen/ and /-cuëtsen/ [(7)] with the difference being that the subject is (probably) not going to the point of reference, but to some other destination.

(8) a. -bidan 'to stop on the road to do something and later continue traveling' (s.t.)
b. -cuidan 'to stop on the road to do something and later continue traveling' (s.i.)

c. mani pe-bidan-nu
banana eat-to stop on the road to do and later continue traveling-INTENT
'I intend to stop on the road to eat bananas and later continue traveling'

d. nes-cuidan-nu bathe-to stop on the road to do and later continue traveling-INTENT
'I intend to stop on the road to bathe and later continue traveling'

3. VERBS. It is interesting to note that /cho/ and /bë/ from example (1)a and b and /nid/ of example (2)b can also be used as the verbs 'to come', 'to bring, carry (transitive)', and 'to go, walk' respectively as in

(9) a. min buchi cho-ec
my brother come-PRESENT
'my brother is coming'.

b. con chido-n mani bë-osh
my wife-ERG banana bring/carry-REC.PST
'my wife brought (carried) bananas'.

and

c. con mado nid-ec
my son go-PRESENT
'my son is going'.

Because they can also be used as the verbs, these suffixes give a hint about the origin of the suffixes in examples (1)–(8). These suffixes may all have been verbs at one time, that have since grammaticalized into suffixes. Clause chaining constructions probably led to this change.

4. CLAUSE CHAINING CONSTRUCTIONS. There are several suffixes which can serve as clause chaining devices (hereafter CCD) in Mayoruna. Kneeland uses the terms principal (primary) sentence and subordinate sentence when describing the clause chaining constructions. She says that a primary sentence is one that can be a complete sentence in itself, and a subordinate sentence is one that depends on a primary sentence to form a complete sentence. The verb in a primary sentence is called the primary verb, and the verb in a subordinate sentence is called the subordinate verb. The suffixes in (10) are examples of the first CCD.

(10) a. -quin simultaneous CCD for transitive primary verbs
b. -ec simultaneous CCD for intransitive primary verbs

c. cho-quin acte chiuin-enda
come-CCD water spill-NEGATIVE.IMPERATIVE
'while you are coming, don't spill the water'.

d. con mado-bëd onque-[e]c tsad-nu
my son-ACC talk-CCD sit-INTENT
'I intend to sit and talk with my son'.

Both verbs have the same subjects, and the action of the verbs occur simultaneously. In (10)c the primary verb is 'spill' and is fully inflected; the subordinate verb is 'come' and is only modified with the CCD.

These suffixes can be used to create longer chains of verbs, and the choice of CCD is determined by the next verb in the chain as in:

e. con mado-bëd onque-quin pe-[e]c tsad-o[c]-[ë]bi
my son-ACC talk-CCD eat-CCD sit-REC.PST-1-SUBJ
'I was sitting, talking, and eating with my son'.

f. pe-[e]c tsad-ec onqui-o[c]-[ë]bi
eat-CCD sit-CCD talk-REC.PST-1-SUBJ
'I was sitting, eating, and talking'.

and

g. pe-[e]c tsad-quin is-o[c]-[ë]mbi
eat-CCD sit-CCD see-REC.PST-ERG.1.SUBJ
'while I was sitting and eating, I saw (it)'.

All three verbs in the chain have the same subjects, and the action of all the verbs occurs simultaneously. In (10)e, the first subordinate verb is 'talk' which has the transitive version of the CCD suffix added because the next verb in the chain, 'eat', is transitive. 'Eat' is treated as the primary verb in the joining of these clauses. The primary verb of the entire chain is 'sit' which is fully inflected.

The suffixes in (11) are examples of the next CCD.

(11) a. -ash sequential CCD for intransitive primary verbs
b. -shun sequential CCD for transitive primary verbs

c. shubu-n pudued-ash tsad-o[c]-[ë]bi
house-LOC enter-CCD sit-REC.PST-1-SUBJ
'I entered the house (and) sat down'.

d. codoca-shun pe-nu
cook.(by.boiling)-CCD eat-INTENT
'I intend to cook (boil) (it) and eat (it)'.

Both verbs have the same subjects, like in (10) above, but the action of the verbs occur sequentially with the first verb in the chain preceding the other verb.

The last CCD discussed in this paper is shown in (12).

(12) a. -anec sequential CCD for intransitive primary 'motion' verbs
b. -tanec sequential CCD for intransitive primary 'motion' verbs

Kneeland (1979:108) tells us that /-anec/ is a combination of a suffix /-an/ 'movement' and the CCD /-ec/ from (10)b above. She also says that /-tanec/ is a combination of /-tan/ in (5)a and /-ec/ (ibid.). Both are used like /-ash/ (11)a above but are used only with motion verbs. Kneeland offers us no explanation as to what the difference between /-anec/ and /-tanec/ is, other than the examples themselves. /-anec/ seems to be able to be used with any motion verb, while /-tanec/ is only used with /cho/ 'to come' as in:

c. pi-anec nid-osh
eat-CCD go-REC.PST.3
'he ate (then) left'

and

d. pachid chic-tanec cho-[o]sh
'yuca' dig.up-CCD come-REC.PST.3
'(after) digging up yuca, he came'

The clause chaining constructions can place two verbs in succession, with only the CCD separating them. This close proximity of the two verbs, along with the desire to code two propositions as a single event, can lead to the beginning of the grammaticalization of one of the verbs. Because of the preference for verb-final sentences in Mayoruna, it would be more likely that a primary verb would become a suffix.

5. THE MISSING DATA. There are two possible clause chaining constructions that could have led to the grammaticalization of the suffixes in (1)–(8) above. One construction would look like the ones described in the previous section. The main roadblock for the grammaticalization process would then be the CCD, whose presence could possibly have prevented it. If the suffixes did come from such a construction, the CCD was probably lost along the way, and the two clauses became conjoined. The other construction would be one in which the clauses could be chained together without the need for a CCD. Either possibility could have eventually led to the current situation in which the verb is now a suffix. The driving force for the conjoining of the clauses would have been one of function. There would have been some difference in meaning between the clause chaining construction and a shortened version without the CCD.

Unfortunately, the data are not yet available to prove that clause chaining is possible without the connector, which would be an important step in the grammaticalization process. A construction like the hypothetical

(13) ?? con mado-bëd onqu tsad-nu

my son-ACC talk sit-INTENT

with a slightly different meaning than 'I intend to sit and talk with my son' would be necessary to support the claim. There would have to be some reason to want to link the two propositions more closely. Perhaps something like 'I intend to have a sitting talk with my son' would be a gloss for (13). Without such data, the proposal is still possible, but not as strong.

6. POSSIBLE ORIGINS. The following are speculations about the possible lexical origins of the suffixes in (1)–(8).

/-cho/ and /-bë/, /-nid/ and /-ban/, /-cuen/ and /-ben/:

The only difference in all the pairs of suffixes are in the verbs to which they can be appended. The first member of each pair is added to intransitive verbs and the second member of the pair to transitive verbs.

It seems readily apparent how the combination of /cho/ 'come' and a verb could have become 'to come doing'. How /bë/ 'to bring, carry' came to have a similar (only transitive) meaning is not quite as apparent. Semantically, 'bring' implies that one is coming while holding some object. It is not difficult to imagine a context for a clause chain that means something like 'he was bringing the baby and talking (to it)'.

The explanation for /-nid/ is similar to that for /-cho/. One possible origin for /-ban/ would follow a similar line as that of /-bë/. It is possible that the lexical verb /ban/ meant something like 'take (carry) away'.

Finally, /-cuen/ is also the lexical verb /cuen/ 'to pass, flee' and has a parallel origin to /cho/ and /nid/. /-ben/ probably is related to /bë/ and /ban/ in having some meaning related to 'carry'.

/-uan/, /-tan/, /-tuid/:

These three suffixes have a common thread of meaning, that of changing location to perform the action of the verb, but it would be difficult at best to speculate as to their lexical origins. There is a verb /tan/ 'to joke, to try to imitate', but it may not have anything to do with the suffix /-tan/ (or if it does the connection is hard to see). There is no lexical equivalent to /-tuid/. The possible lexical equivalent to /-uan/ is the word /uano/ 'very far', which is not a verb, but may have a similar path to grammaticalization. In a clause chaining construction it might come between the two verbs as a modifier to the primary verb, which could lead to its becoming a suffix on the subordinate verb. Unfortunately, Kneeland doesn't give any examples with which to verify this hypothesis.

/-cuëtsen/ and /-bëtsen/, /-cuidan/ and /-bidan/

These suffixes are the most difficult of all to determine their lexical roots. They do have a common thread, that of stopping a trip in order to perform some action, but there is no evidence available to provide any insights. The verb 'to stop' might be helpful, but Kneeland doesn't give it to us.

7. CONCLUSION. The motion suffixes of Mayoruna presented in examples (1)–(8) probably started as fully lexical verbs. As such, they could be used as primary verbs in clause chaining constructions. A clause chaining construction codes more than one event with a single proposition. Over time, such a construction may have lost a connecting particle, in this case the CCD, and the connection between the two verbs became closer. Eventually, at least some of the verbs could not be used as verbs alone, but only as suffixes. Present-day (at least 1979) Mayoruna has verbs that can only be used as verbs, verbs that can be used as verbs as well being used as suffixes, and suffixes that were verbs but have become grammaticalized as suffixes.

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VI. DISCOURSE STUDIES

ON THE TARAHUMARA PARTICLE < PA > : AN OPTIONAL MODE OF DELIMITING INFORMATION SEGMENTS

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1. INTRODUCTION. Students of Tarahumara, a Uto-Aztecan language spoken in Northern Mexico, have described a discourse particle <pa>, that occurs with frequency in most naturally occurring Tarahumara speech. Father David Brambila, a Jesuit Priest who worked among the Central Tarahumara for many decades, finds no significant function for the particle except for euphony. He characterizes the form <pa> as follows (paraphrased from Spanish):

> '...Tarahumara *ba* is an empty expletive particle without any identifiable meaning; it is always stressed and occurs postposed. Its occurrence is always optional'. And, '...the particle *ba* is used optionally when it is called for euphonically by the ear. The alternate form *pa* is simply a phonetic intensification of *ba*. The choice between *pa* and *ba* is always unmotivated. The form *pa* is the preferred form after the Preterito Perfecto and after verbal participles.' (Brambila 1953:48, 1976:42, 419). For example:

i. ma ne bosá **pa**
now 1sg full pa
I'm already full.

ii. hipi nehé **pa**
now 1sg pa
Now it's my turn!

This particle is one of the authentic features of the language, that Brambila says are '*mucho mas frequente en las regiones de habla mas pura*' (much more frequent in the areas that still speak a purer form of the language). Llaguno (1984:6) essentially echos Brambila's view of Tarahumara <pa> but goes on to claim that, '*...(the particle) <pa> can be added optionally to any word in the language.*' He further indicates that there is normally a euphonic alternation between occurrences of <*pa*> and <*ba*> in spoken discourse. Burgess (1982:18) characterizes the particle as an *emphatic* and states that it can be added to a word that already has another emphatic suffix. He further says that occurrences of the particle may be especially numerous in specific genres, for example hortatory texts, like the native sermons that are used at Fiestas, but that a study of the use of the particle in discourse is necessary.

Discourse particles are of course common in the world's languages; but they differ from language to language in shape, source, function, and in their distributions in discourse. They typically occur more often in spoken, conversational genres and often have some interpersonal function.

I propose that the Tarahumara particle <pa> is worthy of study, not only because it occurs almost universally in the natural discourse of the Tarahumaras that still live in isolated areas, but also because it has a wide range of identifiable functions. It is also important from the point of view of general grammaticalization theory to examine the possible sources of the Tarahumara particle in the internal lexicon of the language.

<pa> can occur in texts of any genre, but it is more likely to occur with frequency in some genres than in others, for example in everyday conversations than in ritual speeches. Since the Tarahumara community is still nonliterate in all but a few pockets showing limited assimilation, the culture does not produce or utilize written texts. Because there is little or no social stratification, the range of spoken genres is limited. Genres are defined by the function of the texts, and all but a few specific genres are typically commanded by all members of the community. There is some differentiation by gender in spoken discourse, most notably in intonation contours and statistical choice of expressions, but I have observed no significant statistical variation by sex in the use of the particle <pa>. Also the speech of children contains an abundance of occurrences of <pa> even from the earliest speech. It is apparent, even lacking a formal statistical study, that the particle <pa> is one of the most frequently occurring forms in the language, particularly for areas where the language is still relatively uninfluenced by Spanish.

To begin I will review with you some of the occurrences and functions of the particle <pa> in Tarahumara utterances.

2. SOME FUNCTIONS OF <pa>.

2.1. BOUNDARY DEMARCATION: PROPOSITIONAL FRAMES.

<pa> often occurs at the end of short utterances, and announcing that that segment of information is complete. This is its prototypical function. As such, it functions as a marker of clausal juncture, punctuating the flow. This pattern for delimiting clausal boundaries occurs most often with isolated utterances, but it is also found in extended discourse. It is not obligatory, and, as we will see, it does not always occur consistently in longer discourse.

#_*Event*_ **pa** #_*Event*_ **pa** #_*Event*_ **pa**... _*Event*_ **pa** #

(1) ma suwí **pa** ma ne kusimi **ba**
already *finish* pa *now* 1SG *return* pa
It's all gone! So I'm leaving!

(2) ke ne berá ne maci-am **pa**
NEG 1SG *indeed* 1SG *know*-PART pa
I really don't know!

(3) ma ne kohci-nare **ba**
now 1SG *sleep*-DESID pa
I am sleepy.

(4) ke wesi moci **pa**
NEG *anyone* *sit* (PL) pa
No one is home!

(5) Maria Batista o'co-am **pa** [AG+PAT+EVENT] (but cf. 6, 7, below)
Maria *Batista* *hit*-NOMZ pa
Maria hit Batista.

2.2. Intra-propositional information chunking. What immediately strikes an observer of Tarahumara speech is that the form <pa> does not consistently occur at propositional boundaries. Often <pa> occurs internally within the proposition/clause, and there are frequently multiple occurrences of <pa> in a clause (up to a practical maximum of three).

Tarahumara speakers often do not clearly mark propositional boundaries for the hearer, either by intonation contour, by pause, by word order, or by particle. Thus in transcribing texts it is often difficult to segment the material into clearly defined and delimited clauses and sentences. In Tarahumara the possibility of construing the speaker's meaning is *facilitated* by form, but it is also *enabled* to an enormous degree by pragmatic context and by common sense expectation.

The function of intra-clausal <pa> is to shorten and isolate information segments for emphasis or for special treatment. Since texts are exclusively oral in this culture, speakers often choose to present information in short sequences rather than in longer segments. As a hermeneutic strategy, a rhythmic alternation between heightened *tension* and its immediate *resolution* is often created by the use of <pa> in the discourse flow. The effect is a staccato texture that is at the same time maintained and supported by pause and intonation contours. <pa> is always stressed and followed by a hesitation or brief pause. The accompanying intonational terminal contour lends the segment an added degree of independence. Internal <pa> heightens the context dependency, immediacy, markedness, focus of the expressions it delimits. Thus its occurrence weakens the formal syntactic frames evoked by the most frequently occurring word orders, e.g., SOV, and enables a more context dependent construal of the proposition. The syntax is richer and more varied than it otherwise would be. This in part explains why any attempt to construct a strictly formal grammar of Tarahumara syntax is preordained to failure.

Information chunks delimited in this way vary widely and include both central and more peripheral propositional arguments as well as events.

#__*chunk*__ pa __*chunk*__ pa __*chunk*__ pa #...

Internal <pa> within narrated events may separate out Agents, Patients, etc., and/or Events. The constituents thus occurring outside of the expected syntactic frame are highlighted as more newsworthy, more focused; or they may in some cases be stylistically pleonastic.

(6) Batista **ba** Maria-go **ba** o'co-am **pa**
Batista pa *Maria*-FOC pa *hit*-NOMZ pa
Maria hit Batista / Batista hit Maria.

(7) o'co-am **pa** Maria-go **ba** Batista **ba**
hit-NOMZ pa *Maria*-FOC pa *Batista* pa
Maria hit Batista / Batista hit Maria.

(8) piri tam ora-bo **ba** tamoi-ko **ba**
what 2PL *do/have*-2PL pa 2PL-FOC pa
What are you doing?

(9) ma suwi **pa** batari **ba**
already *finish* pa *corn beer* ba
It's all gone! The corn beer! / The corn beer ran out!

<pa> may similarly separate out and delimit BENEFACTIVE, INSTRUMENT, COMITATIVE, or LOCATIVE arguements, relaxing or overriding the syntax and strengthening the role of pragmatics in the construal.

(10) nehe sunu rari-mea ba muhe a-ga ba [Benefactive]
1SG corn buy-FUT pa 2SG give-CONT pa
I'm going to buy some corn for you.

(11) Arupa muni-go rehpopa-ci ba'pea **ba** muki-ra **ba** [Benefactive]
Guad. beans-FOC *back*-LOC *carry* pa *woman*-OBL pa
Guadalupe is going to carry the beans on his back for the woman.

(12) masilina reroi rihpuna-ma **ba** rihpuga-ti gita **ba** [Instrument]
Masilina potato cut-FUT pa *knife*-INST INST pa
Masilina is going to cut the potatotes with that knife.

(13) ma ku-nawa **pa** bakoci hoonsa **ba** [Locative]
now again-go pa *Chihuahua from* pa
She's arriving now from Chihuahua.

(14) aca n omeru bakiaci si-si-mea **ba** muhe uga **ba**? [Comitative]
Q 1SG MOD *Bakiachi with*-FUT pa 2SG COM pa
May I go with you to Bakiachi?

An animate entity may be marked by <pa> as a vocative, suspending its internal syntactic tie to the event and providing marked focus of attention.

(15) muhé pe ba kipu nahkí [Vocative]
2SG CONJ pa *how many want*
And how many do you want?

2.3. EXTENDED TEXTS. Most extended texts are richly punctuated by occurrences of the particle <pa>. Text A contains numerous instances of <pa>, many of which are not coterminous with propositional boundaries.

1.3.1. TEXT A: HOW RAKILIN GOOSARE'S WIFE TERESA'S FATHER WAS MURDERED NEAR CARICHÍ (told by Rakirin Goosare, April 1991)

> [pe'ta berá ne océ ru-mea **pa** namuti **ba**][apu-regá ni-re nehé opane-ra ra **ba** mairá **ba**]['naka berá karicí eéne-re **pa** mairá **ba**][eci-goná mi'rí-riru-am **pa**][kia-ko **ba** tári **ba**][burito berá nese-am ni-re **pa**][garicí eéna-re **pa**][niwi-a ba][sunú muru-a **ba**][hare-co 'nina arikori pakía-re-am **pa**][kuhta-jí gaminá-re-am **pa**][burito-go ma hume sí-ri-am **pa**] [go'ná na gomíci kosé-a cuhku-re][aré á rá-am **pa**][ahka-ná care-ru-am **pa**][to-tu-ga regá cu'a-ra á **ba**][okwá ka-r-am **pa**]...

Text A

(16) pe'ta berá ne océ ru-mea **pa**
a little indeed 1sg *again say* pa
I am going to repeat a little...

(17) namuti **ba**
something pa
something,

(18) apu-regá ni-re nehé opanera-ra **ba**
manner COP-PRET 1SG *wife*-POSS pa
about what happened to my wife...

(19) mai-rá **ba**
father-of-daughter-POSSD pa
-'s father

(20) 'naka berá karicí eéne-re **pa**
thence indeed Carichi go-PRET pa
Well, ...was on his way down to Carichi...

(21) mai-rá **ba**
father-POSSD pa
her father.

(22) eci-goná mi'rí-riru-am **pa**
there kill-PASS-NOMZ pa
They killed him there,

(23) kia-ko **ba**
long time ago pa
many years ago,...

(24) eta-ri **pa**
COP-PRET pa
it was.

(25) burito berá nese-am ni-re **pa**
burro indeed herd-NOMZ COP-PRET pa
He was herding burros.

(26) garicí eéna-re **pa**
Carichi go-PRET pa
He was going to Carichi,

(27) niwi-a **ba**
harvest-CONT pa
with corn from the harvest,

(28) sunú muru-a **ba**
corn transport-CONT pa
taking corn (to market).

(29) haré-co 'nina arikori pakía-re-am **pa**
other-also PART *whiskey fill*-PRET-NOMZ pa
Some others got him drunk,

(30) kuhta-jí gaminá-re-am pa
neck-LOC *choke*-PRET-NOMZ
and choked him to death.

(31) burito-go ma hume si-ri-am pa
burro-FOC *now race go*-PRET-NOMZ pa
The burros ran away.

(32) go'ná na gomíci kosé-a cuhku-re aré á ráam **pa**
there LOC *arroyo lying butt up crouch-ed* MOD *find*-DUB pa
They found him lying on his stomach in a fetal position down in the arroyo.

(33) ahka-ná care-ru-am pa
thence bring brush-PASS-NOMZ pa
branches piled on him,

(34) tó-tu-ga regá cu'ara á ba
bury-PASS-STAT MOD *face find*
he was found buried face down.

(35) okwá ka-r-am pa
two COP-PRET-NOMZ pa
There were two of them…

In addition to the various micro-functions of the particle <pa>, the overall effect of the speaker's recurrent use of <pa> in extended speech is to lend the discourse a certain *vividness* and *warmth.* The speaker in Text A indicates a degree of *personal involvement* in the events being narrated and that he is motivated to entertain. The speaker also indicates that both the *source* and the *verity* of the narrated information are more immediate.

2.3.2. OPTIONALITY OF < pa > DEMARCATION IN DISCOURSE. Text B lacks any such indication of speaker involvement; <pa> does not occur in the text at all. The speaker was tired when he told the story and did so only with some coaxing on my part. He said his father had told him the story when he was a little boy. Both *source* and *verity* of the events in the story are in this case more remote to the speaker.

TEXT B: A BEAR MAN KIDNAPS A TARAHUMARA WOMAN. (Told by Rakirín Goosare, May 1989)

> tuciaci eena rai o'ru ohi][kuuci cigosi we arega ko'a rai][ici o'ru rehoi ma garega suwabare][ga'o gomici pereame][amina co cigosiri muki] [ma na'pere][ma ranarare][nasipasi nahituame macinare 'ta mucu] [cohpe kitara mi'ririru paca rekowaci][sunu cigoa cihku-ri paca kostarici][cohpe gita rahega me'are][iya ekotare ici o'ru ohi

Text B

(36) tuciaci een-a ra-i o'ru ohi
Tuchiachi go-CONT QUOT-DUB *Bear*
At Tuciaci—a huge bear was going around, they say,

(37) kúuci cigo-si wé aregá ko'á ra-i
children steal-too INTENS *manner eat* QUOT-DUB
stealing children and eating them, they say—

(38) ici o'rú rehoi má gárega suwa-ba-re ga'ó gomici peré-ame
DEMO *big man now whole eat up*-PRET *across canyon live*-NOMZ
that giant ate up all (of the children) living over across the canyon,

(39) aminá có cigó-si-ri mukí
there too steal-COM-PRET *woman*
he also stole a woman from there,

(40) má na'pe-re][má ranára-re
now join-PRET][*now give birth*-PRET
then slept with her and then she gave birth

(41) nasípasi nahí-tu-ame ma'cína-re 'tá mucu
half change-pass-NOMZ *come*-PRET *little child*
to a child that was born half human and half metamorphosed (bear).

(42) cohpé kitara mi'rí-riru pacá rekowa-ci.
(pine sap) torch INST *kill*-PASS *inside storehouse*-LOC
They killed him inside a stone storehouse with a torch.

(43) sunú cigo-a cuhku-ri pacá kostári-ci
corn steal-CONT *bend*-PRET *among corn sacks*-LOC
He was bending over stealing corn out of the sacks

(44) cohpé gita rahe-gá me'a-re
torch INST *burn*-CONT *kill*-PRET
when they killed him burning him with hot coals

(45) iyá ekóta-re ici o'ru ohí.
immed. burn DEMO *giant bear*
the bear was rapidly consumed by the fire.

2.4. EMPHATIC, ASSERTIVE FORCE (~ COPULA). The emphatic <pa> often has the assertive force of a copula, as can be seen in examples (46)–(49). In (46) and (46)' *ci'pawi cokame* when occurring alone would simply mean 'black squirrel' with no assertion implied, whereas both (46) and (46)'. state assertions. When the copula is suppressed the assertive force of the copula is apparently being transferred to the particle <pa>.

(46)	ici ci'pawi cokam **pa**!	~	(46)'	ici ci'pawi cokame hu **pa**!
	DEMO *squirrel black* (COP)	⇐		DEMO *squirrel black* COP pa
	That squirrel is black!			That squirrel is black!

(47) ana'í **ba**!
here pa
I'm over here!

(48) hipi ne sepi ne o'mona **ba**
today 1SG INTENS 1SG *sad* **pa**
I am very sad today.

(49) sepi naurú makúsa-ci **ba**
INTENS sick finger-LOC pa
My finger is very sore.

2.5. FUSED AND QUASI-FUSED EXPRESSIONS (+EMPHATIC). Some expressions, including ordinary greetings, that were earlier analyzable as containing occurrences of emphatic <pa> are no longer separable into independent segments. They are now essentially fused into single expressions. They never occur without final *-ba*, and they are expressions that are independent and already emphatic in their essence.

(50) kwira **ba**! (from Spanish Cuida!)
Hello!

(51) ariosi **ba**! (from Spanish Dios!)
Goodbye!

(52) natétara **ba**!
Thank you! / You're welcome!

(53) ici berá **ba** né!
DEMO *true* pa EMPH
That is indeed true!

(54) kam **pa**
COP pa
That's right!

(55) pe'arí pace **ba**!
tomorrow well/until pa
See you tomorrow!

3. POSSIBLE LEXICAL SOURCES OF THE PARTICLE <pa~ba> (cf. Figure 1, below).

3.1 LEXICAL VERBS

pa-ma 'put, insert' and *ca*-ne-ma / *ca*-ni-mea 'to say, utter'

(56) **ba**-ki-mea 'to enter'
(57) **pa**-ma 'to put, throw, put inside, insert, enclose'
(58) **pa**-*ca*-ma 'to put x inside'
(59) **pa**-*ce*-ma 'to have it put inside'

3.2 LEXICAL ADVERB

(60) **paca** 'inside, in front of, first'

3.3. GRAMMATICALIZED SUFFIX.

(61) rahta-**ba**-ma 'to become hot' (Sp. *ponerse* caliente)
[rahta 'hot', rahta-rema 'to be hot']
(62) rahta-**baca**-ma 'to heat x up, to make x hot'
(63) rahta-**bace**-ma 'to have it heated up'

3.4. GRAMMATICALIZED PARTICLE.

(64) **pace** (Emphatic particle, discourse particle, e.g., English 'well')

(65) ke mu bahi-re **pace** ba?
NEG 2SG *drink*-PRET well *ba*
Well, didn't you drink?

(66) pe'ari **pace** ba
tomorrow well/until *ba*
Well, see you tomorrow.

(67) [**ca/ce** = interrogative particle, alternative question particle]

(68) **aca** ma m bosa pa?
INTERROG *now* 2SG *full pa*
Are you still hungry?

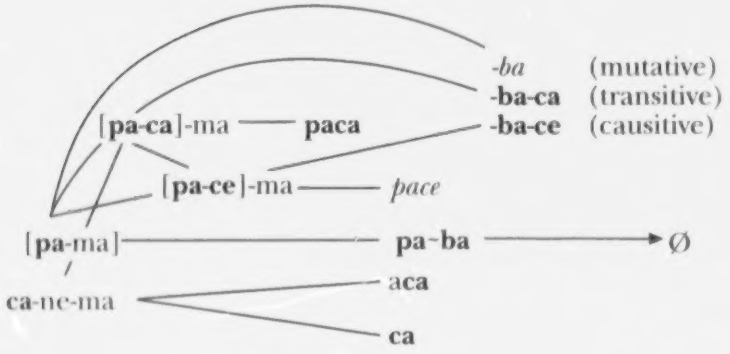

Figure 1.

(69) muhe **ca** nehe **ca**
2SG ALTERN 1SG ALTERN Q
You or me?

(70) nahki **ca** ke nahki **ca**
need ALTERN NEG *need* ALTERN Q
Do you need it or not?

(71) Sahuani **ca** ke **ca**-(we)
San Juan ALTERN NEG ALTERN Q
Juan, yes or no?

4. EPILOGUE AND CONCLUSION. The use of <pa> is often taken by Tarahumara speakers who come under the influence of Spanish to be a mark of inferiority and this perceived status motivates many tribal members to abandon its use as a flavoring particle when they move into a mestizo area where Spanish is spoken. A teacher in a small indigenous school on the Reservacion in Chihuahua City told me and a graduate student from Rice this past winter that, 'we don't use that form [read <pa>] when we speak Raramuri here in Chihuahua; only the people up in the mountains speak like that'. He had, of course, lived in the mountains himself until only a few years earlier.

I have attempted here to argue from my Tarahumara field data that there is much more to be said about Tarahumara <pa> than the sometime claim that it is 'a frequently occurring empty discourse particle'. Its functions are varied, albeit sometimes difficult to identify and codify. Even the fact that Tarahumara discourse is demonstrably possible without the use of <pa> does not diminish its interest value as an important element in the language. Indeed its universal use in the everyday speech of Tarahumaras '*en las regiones de habla mas pura*' makes it imperative to examine its functions carefully. It is apparent that the language is much richer and much more flexible for its presence.

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SUBTLE SIGNALLING OF LOGICAL RELATIONS IN NEWS REPORTING

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INTRODUCTION.

THE REGISTER. Although there is extensive discussion in the literature regarding the language of news media (e.g., Bell 1991; Hicks 1993) and headlines in particular (e.g., Garst & Bernstein 1963; Straumann 1935; Mardh 1980), there is little recognition of the unique way journalists express logical relations in their reporting. True, Turner (1972) discusses the use of *on* in the sense of *about* in his analysis of Australian papers; Vestergaard mentions the use of *to* and *for* to indicate purpose (1977:144); and Babington and LePan show recognition of the logical sense of *over* in citing MAN HELD OVER GIANT L. A. BRUSH FIRE as confusing (1991:288). But there is no systematic explanation of the use of prepositions and adverbials as subtle signals of logic in this register.

Straumann (1935) coined the term 'block language' for headlines, and Halliday (1967) used the term 'economy grammar' to reflect their condensed style. The style of news reporting is analyzed by Crystal and Davy (1969), yet there is no mention of the distinctive feature of signalling logical connections.

THE RELATIONS. I use the term 'logic' (e.g., 1988) to encompass the binary relations of cause-effect, basis-assessment and purpose-means, with additions of enablement (Mann, 1987) and emotive effect (Mann's nonvolitional result). This is a more practical meaning-based definition than that adopted in philosophy, yet it is much more precise than, for example, Ballmer's (1978) *Logical Grammar,* Winter's (1982) 'logical sequence', Labov's (1970) *The Logic of Non-Standard English,* Halliday's general use of 'the logic of language' (1978:86) and Martin's 'logico semantic relations' of additive, comparison, temporal and consequential (1992:178–79). My use of 'logic' corresponds more closely with 'formal reasoning and inference' as found in language use rather than made-up examples.

Likewise I use the term 'cause' in a more specific way than does Itkonen (1983), who defines 'causal linguistics' as factors that contribute to linguistic behaviour; my interest is in real-life causes and their effects as expressed in language. I take purpose-means from Healey's (1965) use of the term 'means' as this avoids confusion with the use of 'instrument' as both causer of an effect and the means of achieving a purpose.

There is rarely any difficulty in distinguishing between purpose-means and the other logical relations. Between clauses, purpose is usually clearly signalled by the *to*-infinitive in both clausal and nominal functions (Jordan 1994a) and means is indicated by *by...ing* or the word *means*. Between sentences, this relation is signalled by the 'vocabulary 3' words (Winter 1997), which indicate what the relation is (e.g., *purpose, objective, aim,* and *means, method,* and *how*). However there can be confusion between cause-effect and basis-assessment.

TELLING THE DIFFERENCE. I adopt Quirk et al.'s definition of 'the unwitting (generally inanimate) cause of an event' (1972:351) as my meaning of cause-effect, whereas basis-assessment is evidence, grounds or reasoning that produces considered judgement, assessment, or decision. Thus I perceive Chierchia and McConnel-Ginet's (1990:355–56) example of

A 'Germany invades Poland', and
B 'Britain enters war against Germany'.

as a basis-assessment relation (not cause-effect as they claim) because considered judgement was involved, whatever the political stance may have been at the time.

Similarly, the following sentences identified as cause-effect by Longacre (1972:98) are basis-assessment, as they involve considered judgement:

> 'Because it is not funny, we will not stay'.
> 'Because you are not a good man, I will not give it to you'.

Also Hoey (1983:19) classifies

> 'She was here because she was waiting for somebody, or something'.

as cause-consequence, whereas I regard it as assessment-basis because action follows considered judgement based on a desire.

And Farr, Love and Whitehead (1985:142) cite

> 'Brothers die (therefore) kinfolk get upset (therefore) they roast poisons'.

as cause-effect, whereas I regard the first as emotive result and the second as an assessment, as it is a conscious decision.

I regard what Longacre (1972:73) calls 'efficient cause' (e.g., *You are afraid so you didn't go*) and 'cause margin' (e.g., *You didn't go because you were afraid*) both as basis-assessment, whereas his 'final cause' (e.g., *He took it in order to eat*) is means-purpose.

The distinguishing feature between cause-effect and basis assessment is whether or not there is conscious choice in real life. This is in line with Anscombe's (1957) distinction that it is a 'cause' if there is a mere response to something but a 'reason' if thought is involved. Cases of involuntary reaction (e.g. a sudden noise making someone jump) are emotive result; Mann et al (1992) refer to this as nonvolitional result, although their examples (ibid.:54, 58) do not meet this criterion.

THE RELATIONS IN PRACTICE

THE CAUSER AS SUBJECT OR BASIS. There is clear recognition of the use of subjects of simple clauses as the causes, with the verb as the indicator of cause-effect and the object or complement as the effect. This is shown by Quirk et al.'s example of 'The avalanche destroyed several houses' (ibid.:351) and by Longacre's use of 'Agent and Causer' (1972:80). Butler (1985:167–68) uses the term 'causer' for both subject and agent in the *John threw the ball* and *The door was opened by John*, and Halliday and Fawcett (1987:143) use the terms 'causative' and 'third party causation' in the same way. Davidse (1992:116–21) explores the connection between causation and transitivity, and the use of causer and causative verbs is analyzed in some detail by Dixon (1991:93–198, 292–97). Farr et al. (1985:138–43) extend the principle by pointing out that 'cause' can range from enabling to sufficient cause and includes discussion of assessment as well as cause-effect statements. Jordan has analyzed cause-effect relations within and between clauses (1989a, 1992, 1995a) and also within complex new and anaphoric nominals (1989b, 1993, 1994b, 1995b).

The signalling of cause-effect (and basis-assessment) within the clause instead of between clauses and sentences is relevant for the register of news reporting because journalists have limited space (especially for headlines) and thus need to compress both cause and effect into a single 'statement'. There is also a need to provide writing that is interesting to their noncaptive readers, and the connection of cause-effect and basis-assessment into a single 'statement' helps to achieve this. In the extract

(1) Report finds attitudes still keep women out of top management jobs. (Feb 28:22)

(Examples are from the *Kingston Whig Standard* unless otherwise noted) the subject of the main clause (*attitudes*) is the cause, and the predicate is the effect. This is a summary of the first sentence/paragraph of the text, which again is a cause-effect relation within a simple clause:

(2) THE STEREOTYPE AMONG MEN THAT women can't have kids and be dedicated to their jobs at the same time is still keeping female executives from making it to the top of corporate America, a new study says. (ibid.)

News reporters typically treat many statements as 'known' in this way by presenting them as complex nominals rather than clauses announcing existence. This forces the writer to express the logical connection within the sentence rather than between separate sentences. We will shortly examine other ways of achieving this result with the use of adverbial and prepositional indicators of logical connection.

Farr et al.'s recognition that relations other than cause-effect occur within the clause is important for the register of news reporting. Here we see a basis-assessment relation with basis as the complex nominal-subject of the sentence:

(3) TAX BILLS THAT ROSE 16 TO 18 PERCENT THIS year for some of the smaller property owners in Kingston's industrial park have made several businesses decide to sell and get out. (Jun 20:1)

Although the verb form *have made* perhaps gives the impression that the increased taxes have caused the businesses to relocate (and we could actually paraphrase it that way without significant loss of meaning), we know it is basis-assessment because the owners made a conscious decision based on the changed circumstances. This is clear in the use of the verb *decide.*

THE TWO RELATIONS IN PRACTICE. The distinction between cause-effect and basis-assessment is not always quite as clear. The headline

(4) Celebrity Sportsworld facing closure *thanks to* regulations (*Kingston This Week,* Jun 19:6A)

gives the impression that the regulations are directly causing the closure, i.e., that the owner has no option. The later text is perhaps less clear:

(5) We are concerned that the family entertainment facility will close *due to* the negative reaction from a few people to the water park expansion. (ibid.)

Now it appears that the owner's plans to expand are being blocked by regulations, and that it is a conscious decision to close the facility. However an account of the same story in another newspaper gives a different slant:

(6) Owners have 35 days to meet debts or face closing facility

> THE LARGEST FAMILY RECREATION facility in greater Kingston is in danger of closing—a move that would throw more than 20 people out of work. (Jun 18:11)

The consequential *or* indicates that the closure is being caused by financial problems, which the owners are saying are being caused by the refusal of residents and council to permit expansion. As the owners have no choice but to close the facility because of financial pressures, the relation is cause-effect and not basis-assessment. The final relation in (6) is clearly cause-effect, as the dismissals would be forced.

These examples illustrate that we are dealing with logical relations in real life as expressed by the writing. The type of real-life relation may not always be clearly communicated by the logical signals used, but the wider context often allows us to determine the real-life relation. As clear expression in some form or other of the logical relations present would appear to be a vital element of the message being conveyed, we should expect to be able to determine those relations either from the logical signalling itself or the wider context. As news reporting relies more on the subtle adverbial and prepositional signals of logical connection than on specific signals of logical relations, we must rely more the wider context to determine the real-life relations.

Yet even those specific signals can be misleading. By reading Halliday and Hasan (1976) and Martin (1992), we might conclude that the three 'causal' relations are always clearly signalled when by the 'specific' indicators of *reason*, *result* and *purpose* are used. However Jordan (1995a) shows that this is not always so with the following examples:

(7) *As a result*, American businesses scrambled to introduce bicycles to compete with popular imports. (*Popular Science*, May 1995:68)

(8) Low yields have *caused* Continental Airlines to cancel its thrice weekly Honolulu-Melbourne flight… (*Aviation Week and Space Technology*, Feb 24:59)

In spite of the 'clear' signals of cause-effect, these are basis-assessment relations as conscious business decisions are involved. The opposite occurs in

(9) Overharvesting has damaged fish populations, and *consequently* fishing communities. (*Popular Science*, May 1995:85)

This relation is cause-effect although the word *consequently* might lead us to think it was basis-assessment. The dual role of *consequently* is noted by Avis et al. (1976:1148):

> 'Consequently...indicates a reasonable conclusion, but may also be used to connect a statement of effect or result: *He is the popular candidate; consequently he will be elected. I overslept and consequently was late*'.

Thus in news reporting, we often need to determine the logical relation present through an understanding of the real-world situation and actions. The signals themselves may not allow readers to determine what logical relation is intended.

ADVERBIAL SIGNALS OF LOGIC

THE PRINCIPLE OF DUAL RELATIONS. Karlsen (1964:12) was the first to recognize dual relations:

> 'In my view, then, the justification for the existence of the mixed identifying-specifying type of clause is to be found in...'

That is, he recognized some clauses as performing dual semantic roles. This is relevant to our study here, as some clauses connected by adverbs signal both time and logical connections.

Winter (1974:279) discusses dual relations of denial and assessment by explaining that sentences such as 'What nonsense'. have these two elements, which can be identified by the questions they answer: 'Is that true?' and 'What do think about it?'. The complexities of 'joint', 'combined' and 'simultaneous' relations are discussed by Jordan (1978:38–47).

DUAL LOGICAL AND TIME RELATIONS. Many logical relations in news reporting are signalled not by a conventional logical indicator at all, but instead by an indication of time:

(10) Bomb on bus kills two, injures nine

> A soldier and a civilian were killed and nine other people were injured *when* a bomb exploded on a bus in Pakistan's Punjab province... More than 50 people have been killed and scores

> wounded *in* a mysterious series of bomb blasts in Punjab province since last April. (Jun 18:28)

If read literally out of context, the first sentence would tell us that two things happened at the same time; there is no overt signal of logic between the two clauses. However we know from the headline that the bomb explosion was the *cause* of the deaths and injuries. Thus this is a dual logical/time relation. The use of the preposition *in* for the same function in the second sentence will be discussed later.

Simultaneity is even clearer with the signal *while*, as in

(11) Stich injured *while* dressing

> A locker-room incident knocked out another seed at the Italian indoors ATP tournament in Milan yesterday. Michael Stich reinjured his long-troubled left ankle *while* dressing for a second-round match at Milan's Palatrussardi Arena. (May 1:23)

The headline gives no intimation of a logical connection between the two events—he could have been bashed on the head while dressing. The text, however, indicates that he injured himself, and we can thus presume that the injury was accidental and resulting from his dressing, i.e., a cause-effect relation, as well as one of simultaneity.

Logical time connections signalled by *after*, *when* and *before* are included in the following example:

(12) 14 killed *after* overcrowded viewing platform collapses

> THIRTEEN COLLEGE STUDENTS AND a park guide plunged 30 metres to their deaths *when* a wooden viewing platform on a cliff collapsed onto rocks below...
>
> Police are investigating claims that 14 people crowded onto it *before* it collapsed. (Apr 29:20)

Certainly the 14 were killed after the collapse and when the platform fell onto the rocks, but the deaths were a result of the collapse and fall as well. That is, these are dual relations of time and cause-effect. In the final sentence we are told that the crowding occurred before the collapse, but presumably that was also the cause of it—again a dual relation of logic and time.

INDIRECT AND PARTIAL LOGICAL RELATIONS. The time subordinator *after* does not always indicate or intimate logic, of course. It often simply indicates that something happened after something else, as in:

> (13) Man arrested *after* three-hour standoff
>
> Police coaxed a 45-year-old man out of a house on Kingston Mills Road yesterday *after* a three-hour standoff… The man faces alcohol, assault and firearms charges. (Jun 21:1)

Although it is possible that the firearms charges stemmed from the three-hour standoff, the other charges are unrelated to it. Thus *after* here is at most a weak indicator of partial basis as well as a signal of time.

The logical relation indicated by *after* can be indirect:

> (14) A 51-year-old man faces charges of being intoxicated in a public place *after* he refused to pay a $16 cab ride yesterday afternoon. (Jun 31:2)

The charges are not directly related to the refusal to pay, which is a civil, not a criminal, matter. However the refusal presumably resulted from his intoxication and led the police to lay charges based on his condition at the time.

The logical connections are direct in the following example:

> (15) Two suspects arrested *after* man attacked in building
>
> A 26-YEAR-OLD CITY RESIDENT required several stitches to close cuts *after* he was punched and kicked by two attackers at his apartment building in the 300 block of Rideau Street. (Jun 19:2)

The relation in the headline is basis-assessment as well as time: the arrest decision is based on the evidence of assault. In the text the assessment of the need for stitches not only follows the punching and kicking, but is also logically related to it. The assessment is based on the severity of the injuries caused by that punching and kicking—first cause-effect and then basis-assessment.

OTHER LOGICAL/TIME SIGNALS. Any time adverbial can also indicate or intimate a logical connection as well as time. Here we see *following* being used as a partial logical connector:

(16) Teen charged *after* chase

> A 16-YEAR OLD MALE FACES several charges *following* a police pursuit of a speeding vehicle on Montreal Street around 9:40 pm yesterday... The youth is charged with car theft, possession of stolen property over $5,000, driving without a licence and engaging in a police pursuit. (Feb 28:2)

Only the last of the four charges follows logically (as basis-assessment) from the pursuit; the other three charges are not logically connected to it.

As the subordinator *as* is well known as an indicator of time or logic, we should expect its use in the dual time/logic role:

(17) Low mortgage rates boosting market

> Housing markets, fuelled for some time by first-time buyers, should get a boost *as* more homeowners take advantage of lower mortgage rates to trade up. (May 2:16)

The conditional conclusion in the main clause is based on the assumed action of homeowners in the subordinate clause.

PREPOSITIONAL SIGNALS OF LOGIC

THE WEAK 'CONNECTION' RELATION. Jordan (1974:182–86) has identified a weak 'connection' relation between passages of text. In this relation, something is added in connection with an earlier passage that does not fit an established form of connection (such as cause-effect or basis-assessment). Typical signals of this relation are 'in this connection/respect/regard' or the subordinator 'in connection with'. Many 'connection' relations imply logical connections:

(18) Kingston man charged *in* jewelry store robbery

> A 30-YEAR-OLD KINGSTON MAN faces a robbery charge *in connection with* a daring jewelry heist at Ciro's Jewellers in the Kingston Centre last November. (Jun 28:2)

The connectors *in* and *in connection with* are not prepositions in the locational sense, nor are they verb particles. Instead they are semantic clause connectors operating semantically and syntactically like *as a result of* or *because of*. In this register, however, their use as an indication of the weaker 'connection' relation is much more common than such overt signals of logical connection.

The relation is stronger in

(19) James Mackie killed *in* accident

> A KINGSTON TOWNSHIP MAN WAS killed Tuesday evening *when* his Jeep skidded off an icy highway near Lindsay and slammed into a tree. (Feb 29:9)

The logical connectors *as a result of* and *because* would have been much more appropriate here than in (18) because the logical connection is much clearer. The man was not just killed *in* the accident, but *by* or *as a result* of it. Similarly, his death did not just occur *when* his Jeep skidded off the road and slammed into a tree, but *because* of it. These are clear cause-effect relations. Thus the meaning of the linking word *in* can range from a weak indication of connection to a clear logical relation.

The logical signal *in* should not be confused with its use to indicate *during*, which is often found in this register:

(20) Man shot by police *in* chase (*Toronto Star*, Feb 3:A4)

(21) Woman, 73 [*sic*] beaten *in* sex assault (ibid.)

USING *FOR* AS BASIS. The preposition *for* signals basis in

(22) Bishop who ordained gay man faces trial *for* heresy

> A NINE BISHOP EPISCOPAL CHURCH COURT WAS URGED TO PUT a stop to 'lone rangers' among its clergy yesterday by making a bishop stand trial *for* heresy *for* ordain*ing* a gay man. (Feb 28:22)

The legal basis for the trial will be heresy, and the specific instance of alleged wrong doing is the ordination of a gay man. This is indicated weakly in the relative clause in the headline and strongly in the *for ordaining* clause in the text.

We can recognize that *for... -ing* is a stronger signal of basis than *in (connection with)* by paraphrasing (18) with *for carrying out* instead of *in connection with*. Also *for... -ing* is a stronger signal of personal involvement:

(23) AIDS victim charged *for having* unsafe sex

> IN A RARE LEGAL MOVE, THE CROWN has charged a 29-year-old AIDS victim with criminal negligence causing bodily harm *for having* unprotected anal sex with a partner without informing him of his condition. (Jun 20:3)

Normally, having unprotected sex is not a criminal matter, and we are given a clue to the basis of the charge in *AIDS victim* in the headline. The full basis is provided in the text as the *for having* clause. The paraphrase *in unsafe sex incident* would not have been as clear because *for... -ing* indicates that the accused is personally involved in the incident.

Similarly, *in the throwing of acid...* in the following example would not have indicated so clearly that the accused had actually done the throwing herself:

(24) A JUDGE HAS SENTENCED A BUSINESSWOMAN TO 12 YEARS IN jail and ordered her flogged *for throwing* acid on a former business partner. The sentence came *after* the Port of Spain First Criminal Court found Bhagwansingh, a mother of four, guilty *of wounding* with intent to cause grievous bodily harm. (May 1:32)

In addition to the signals of *after* and *for throwing* to indicate basis, we also have *of wounding* as an indication of the legal basis, i.e., guilty *of* (legal basis) *for* (specific instance).

OVER AND *UNDER*. The locational and logical meanings of over can lead to initial misunderstanding, as noted earlier. Also the headline

(25) FAA official forced out *over* crash (Jun 19:20)

might give the impression that the official was thrown out of an aircraft over the scene of a crash, whereas this was a (presumably forced) retirement (assessment) brought about by (basis) an analysis of the causes of a crash. Similarly, the headline in

(26) Seafood restaurant sued *over* its cooking oil

> A TORONTO MAN WHO SAYS HE SUFFERED stomach upset *after* eating a meal last summer at a Red Lobster outlet has launched a class action suit against the company that owns the restaurant chain. (Feb 1:27)

should be construed as indicating basis for the legal action, not that the owners were being cooked over their own oil. The basis is given in more detail in the form of an alleged cause-effect relation signalled by *after*.

In contrast, *under* can indicate cause:

(27) The township said management staff received a raise *under* terms of an old agreement after the social contract expired in April. (Jun 19:9)

The raise results from the terms of the agreement, as the township had no choice. The relations are more complex in

(28) OPENING A NEW GARBAGE DUMP IN ONTARIO will become quicker and easier, *under* new rules proposed yesterday by Environment Minister Brenda Elliott.

Approval time is slashed from an average three years to 18 months *by limiting* public input. (Jun 18:1)

Although the first sentence sounds more like assessment-basis than effect-cause, the second sentence provides details of what will actually happen as a result of the new rules. Thus the clauses in the first sentence are effect-cause connected by *under*, while the second sentence provides basis for the assessment in the whole of the first sentence. The means of achieving the reduction is given in the *by limiting* clause.

WITH AND *FROM*. The subordinator *with* can be used to indicate cause:

(29) And *with* the last boat leaving in the afternoon, many more found it difficult to make it home again. (*Queen's Journal*, May 1:1)

The paraphrases *because* or *as a result of* could have been used here with slight changes to the grammar.

The usual meaning of *with* is accompaniment, but assessment-basis can also be involved:

(30) The man was rushed to Credit Valley Hospital *with* a non-life-threatening gunshot wound in the neck. (*Toronto Star*, Feb 3: A4)

The statement 'The man was rushed to hospital with his wife'. would have been simply a matter of accompaniment. Here, however, the gunshot wound was also the basis for the decision to rush him to hospital. This is an example of a dual relation, much like the use of the adverbial indicators discussed earlier.

We also find *with* as an indicator of the means relation:

> (31) MORE THAN EIGHT MILLION BABIES WORLDWIDE die each year before reaching their first birthday, mostly *from* disease or inadequate care in the first weeks of life...
>
> A World Health Organization study says this toll could be drastically lowered *with* better clinical health care for mother and infant. (Jun 18:28)

The means relation is apparent by the paraphrase *by providing better.*

In (31), we also see an example of *from* to indicate cause, a feature noted by Quirk et al. (1972:321). The meaning of cause is also clear in

> (32) SECOND-HAND SMOKE: Kills more than 330 non-smoking Canadians a year *from* lung cancer; estimated 3,000 Canadians die prematurely a year *from* heart disease. (Jun 20:4)

Second-hand smoke causes lung cancer and heart disease, which in turn cause premature deaths.

CONCLUSIONS. The register of news reporting has special needs to present information in a brief, informative and interesting way. To do this, reporters usually present both elements of the binary logical relations within a single sentence signalled by indicators other than those commonly used in other registers. Although there are occasional instances of overt logical connection (such as *as a result*) in this register, many logical connections are indicated by adverbial or prepositional signals. Such use is a characteristic feature of this register.

Adverbial indicators of logic in news reporting signal dual relations of time and either basis-assessment or cause-effect. Although one element of discussion occurs before, during or after another, we can tell from the context and the messages being conveyed that a logical connection is also being expressed, though often in quite a subtle way. Prepositional indicators range from the weak 'connection' relation to full logical expression. Some prepositions typically signal cause (*from, under*), others usually indicate basis (*in, over, of, for*), while *with* signals either.

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THE GRAMMATICAL STRUCTURE OF A NEW GUINEA PIDGIN PROCEDURAL DISCOURSE

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1. INTRODUCTION. New Guinea Pidgin (also known as Tok Pisin or Melanesian Pidgin) is spoken by some million and a half people, about 100,000 or more for whom it is the first language (Lynch 1990:387). It is the lingua franca for a large section of a country in which well over 700 minority languages are spoken (Romaine 1992:9). The present paper, in discussing the grammatical structure of a short procedural discourse, gives insights into some basic features of New Guinea Pidgin grammar.

The text concerns the hornbill bird and how it is captured in order to be eaten. The story with interlinear glosses and free translation is on the next page; it is opposite a tree diagram of its grammatical discourse structure, developed down to at least sentence level. The descriptive model used here is TAGMEMICS in which four features are identified for each unit (TAGMEME) unless some features are redundant.: (1) CLASS (above a line of a tree), (2) SLOT (below the line), (3) ROLE (following the slot label), (4) cohesion/agreement constraints (in a paragraph after the tree diagram).

2. CONSTITUENT STRUCTURE OF THE TEXT WHICH IS A PROCEDURAL DISCOURSE. The total discourse has three immediate constituents (ICS). The nuclear constituent is readily identified as contrasting with the beginning and ending constituents in that each of its sentences begins with a sentence marker (shown in italics face). Then within that nuclear tagmeme the different sentence markers signal further segmentation: (1) the sequence of ***orait*** marked sentences is broken by the ***sapos...orait*** 'if-then' marking, thus commencing a second sequence of *orait* sentences, (2) a second, but weaker break is the ***na-tasol*** 'and...but' sequence of sentences. The relation of these will be presented below.

The class manifesting the nuclear constituent is Procedural Paragraph (P¶)1 (the only significance in the number 1 is to identify it from other examples of the same emic unit) in the nuclear slot with the role of procedure (a P¶ may fill roles other than that of procedure). The other constituents are marginal in relation to the nuclear tagmeme. The first IC is manifested by a Topic ¶ with the role of setting. The last IC is manifested by an Identive

New Guinea Pidgin text by Koyao Naufafe

1 **Ol kokomo i save kar-im pikinini insait long hul bilong wanpela diwai.**
they hornbill i know (habitual) bear child inside x hole of a tree
Hornbills bear young in a hole in a tree.

2 **Nem bilong dispela diwai kwila.**
name of this tree ironwood
The name of this tree is the ironwood.

3 ***Orait*** **taim dispela pisin i gat kiau i stap insait long bel bilong en bai em i**
so when this bird i have egg i be inside x insides of it will it i

go insait long hul bilong dispela diwai.
go inside x hole of this tree
So when this bird has an egg in its insides it will go inside a hole in this tree.

4 ***Orait*** **em i sindaun na kar-im kiau bilong en.**
then it i sits and lay egg of it
Then it sits down and lays its egg.

5 ***Orait*** **bihain kiau bilong en i bruk na kamap pikinini.**
then later egg of it i break and become child
Then later its egg will break and become a child.

6 ***Orait*** **pisin man i bring-im kaikai long tupela inap long tu mun tri mun.**
then bird man i bring food to two for x two month tri month
Then the male bird brings food to the two of them for two or three months.

7 ***Sapos*** **man i luk-im dispela ples bilong dispela pisin i sindaun orait ol i**
if man i see this place of this bird i sit then they i

go na ol i kis-im longpela kanda na longpela diwai.
go and they i get long rattan and long wood
If someone sees the place where the bird is sitting, then they go and get long rattan and long piece(s) of wood.

8 ***Orait*** **ol i kat-im longpela mambu na olgeta samting.**
then they i cut long bamboo and all thing
They cut (a) long bamboo and everything.

9 ***Orait*** **ol i luk-im wanpela liklik diwai i stap klostu long dispela bikpela diwai.**
Then they i see a little tree i be near x this big tree
Then they find a little tree that is near the big tree.

10 ***Orait*** **ol i goap long dispela liklik diwai na ol i stap long en na ol**
then they i go up this little tree and they i be in it and they

tromoi rop o kanda i go long han bilong dispela bikpela diwai.
throw vine or rattan i go to branch of this big tree
Then they climb the little tree and they stay in it and throw a vine or rattan and it goes to a branch of the big tree.

11 ***Orait*** **ol i pul-im i go na pas-im long han bilong bikpela diwai.**
then they i pull i go and fasten to branch of big tree
Then they pull it and it goes and they fasten it to the branch of the big tree.

12 ***Orait*** **bai ol i kil-im dispela pisin kokomo na ol i kuk-im kaikai.**
then will they i kill this bird hornbill and they i cook eat
Then they will kill the hornbill bird and cook it and eat it.

13 ***Na*** **dispela pisin ol manki i no inap kaikai**
and this bird they boy i not able eat
Now boys are not allowed to eat this bird.

14 ***Tasol*** **ol bikman ol i save kaikai.**
but they old-men they i know (habitual) eat
But older men are able to eat it.

15 **Em tasol liklik stori bilong kokomo**
that's all little story of hornbill
That's all the story about the hornbill.

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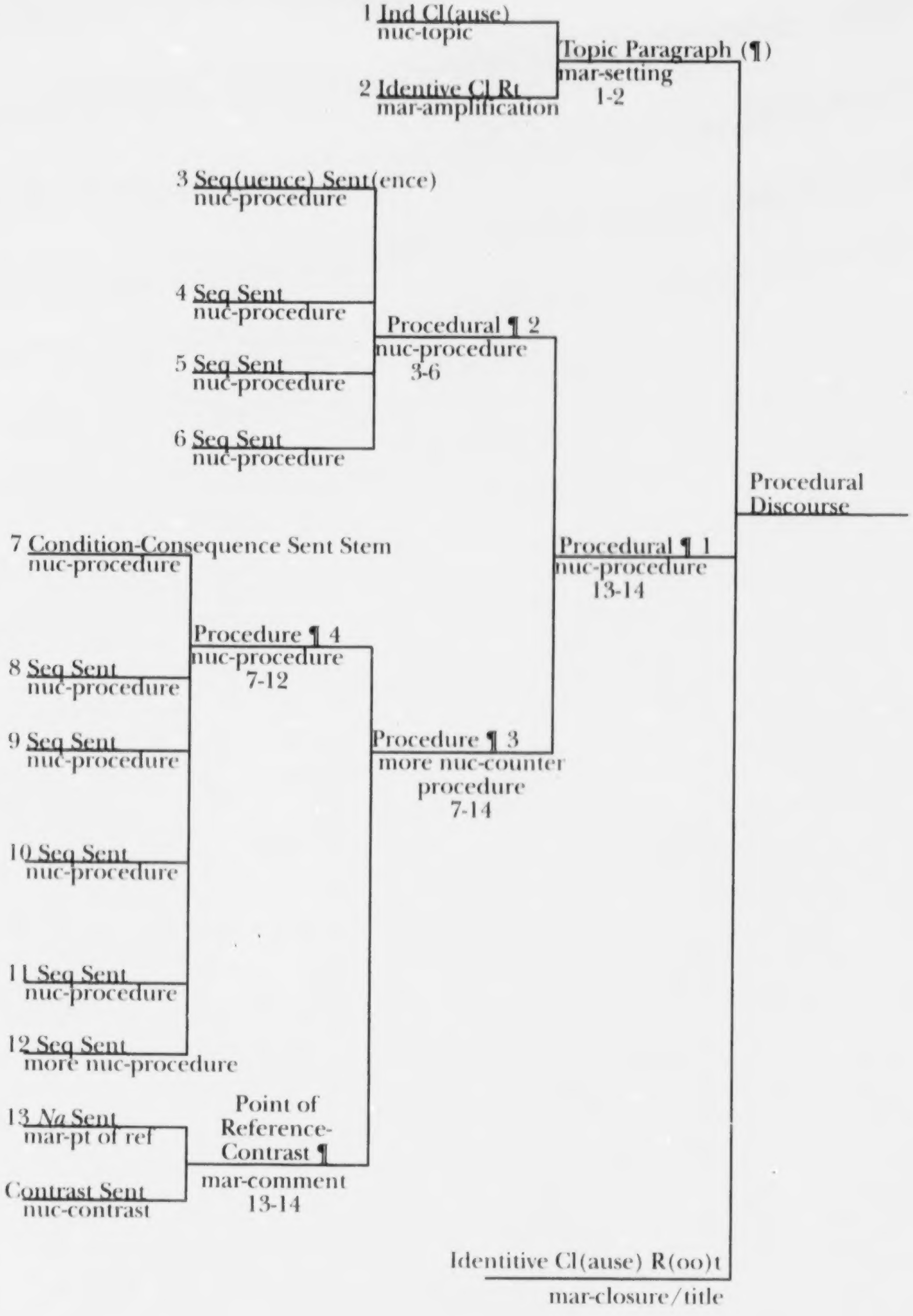
Tree Diagram of the Hornbill Discourse


1 Ind Cl(ause)
nuc-topic
2 Identive Cl Rt
mar-amplification
Topic Paragraph (¶)
mar-setting
1-2
3 Seq(uence) Sent(ence)
nuc-procedure
4 Seq Sent
nuc-procedure
5 Seq Sent
nuc-procedure
6 Seq Sent
nuc-procedure
Procedural ¶ 2
nuc-procedure
3-6
Procedural
Discourse
7 Condition-Consequence Sent Stem
nuc-procedure
Procedural ¶ 1
nuc-procedure
13-14
Procedure ¶ 4
nuc-procedure
7-12
8 Seq Sent
nuc-procedure
9 Seq Sent
nuc-procedure
Procedure ¶ 3
more nuc-counter
procedure
7-14
10 Seq Sent
nuc-procedure
11 Seq Sent
nuc-procedure
12 Seq Sent
more nuc-procedure
13 Na Sent
mar-pt of ref
Point of
Reference-
Contrast ¶
Contrast Sent
nuc-contrast
mar-comment
13-14
Identitive Cl(ause) R(oo)t
mar-closure/title

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Cl(ause) R(oo)t (a clause root is the nuclear element of a clause—the predicate with its juxtaposed arguments) with the role of closure or title. Cohesion features do not appear on the tree for reasons of space, but some will be addressed later on in the paper.

The Topic ¶ (first IC of the total discourse) has two ICs. The first is an Independent Clause (IndCl) which is the nucleus of the paragraph having the role of topic, whereas the following Identive Cl Rt is the margin with the role of amplification of that paragraph (Longacre, in press:4.10).

Since the ICs of the class manifesting the last discourse IC are lower than sentence level, they will not be discussed in this paper.

P¶1 (nuclear constituent of the total discourse) has two ICs. Each is a P¶ (2, 3) embedded in the larger P¶1 (ibid. 4.11); each is nuclear, but the second, P¶3, is probably the more nuclear. It is more nuclear because the following features heighten its prominence: (1) it is more complex in that it has two embedded paragraphs the first of which has more ICs than any other paragraph, and includes more than just Sequence Sentences, cf. Procedural ¶3, (2) the last sentence includes the infrequently used *bai* 'future time' morpheme, (3) also includes the fullest designation of the hornbills: *dispela pisin kokomo.* The first paragraph, P¶2, has the role of procedure which is what the birds do when it is time to raise a family. The second paragraph, P¶3, has the role of counter procedure which is what the men do in opposition to the birds' family.

P¶2, in the less nuclear slot of P¶1, has only four ICs each of which is a Sequence Sentence (SeqSent), marked with *orait.* These are the procedures performed by the birds.

P¶3, in the more nuclear slot of P¶1, is more complex than P¶2 for reasons mentioned above. The nuclear tagmeme is manifested by P¶4 which has six ICs. Once again we note that the difference between nucleus and margin is a cline in that the last IC is identified as being the more nuclear slot. The sentence condition marker *sapos* 'if' marks the segmentation break from the sequence of four preceding *orait* marked sentences. Then follow five *orait* marked sentences which are the ICs of P¶4.

The second IC of P¶3 is a Point of Reference-Contrast ¶ manifesting a marginal slot with the role of comment. The *na*, as a sentence marker, signals a closer relation to what precedes than does either *orait* or *sapos*; hence the Point of Reference-Contrast ¶ is considered to be an IC of P¶3 rather than of P¶1.

Sentence (Sent) 13 is the *Na* Sentence in the margin slot, of the Point of Reference-Contrast ¶. It has the role of point-of-reference. It is followed by the second IC of the paragraph (Sent 14): a Contrast Sentence marked by *tasol,* which is the sentence contrast marker. The Contrast Sentence fills the nuclear slot of the paragraph and has the role of contrast.

It is to be noted that the most nuclear sentence in the discourse is Sent 12, that which gives the main purpose of the discourse. It is to be identified by following the nucleus of each embedded, lower level unit: P¶1 is the nucleus of the total discourse; its nucleus is P¶3 whose nucleus is P¶4 and its nucleus is Sent 12:

Orait	*bai*	*ol*	*i*	*kil-im*	*dispela*	*pisin*	*kokomo*	*na*	*ol*	*i*	*kuk-im*	*kaikai.*
then	will	they	i	kill	this	bird	hornbill	and	they	i	cook	eat

'Then they will kill the hornbill bird and cook it and eat it'.

3. SOME COHESION FEATURES

3.1 TIME AND/OR ASPECT. The time and/or aspect of the first sentence in a paragraph serves as the point of reference for the rest of the paragraph.

In Sent 1 the aspect morpheme *save* 'know (habitual)' serves for the whole Topic ¶, there being no other time or aspect in the paragraph.

In Sent 3 a different time/aspect reference point is set up for both P¶s1 and 2. This is done by two constitutents, the first is a sentence level constituent which precedes the main clause: the Time Clause. The second constituent is a sentence level constitutent preceding the subject: the aspect marker *bai* 'will/incomplete'. The Time Clause is

taim	*dispela*	*pisin*	*i*	*gat*	*kiau*	*i*	*stap insait*	*long*	*bel bilong*	*en*
when	this	bird	i	have	egg	i	be inside	x	insides of	it

'when this bird has an egg in its insides it',

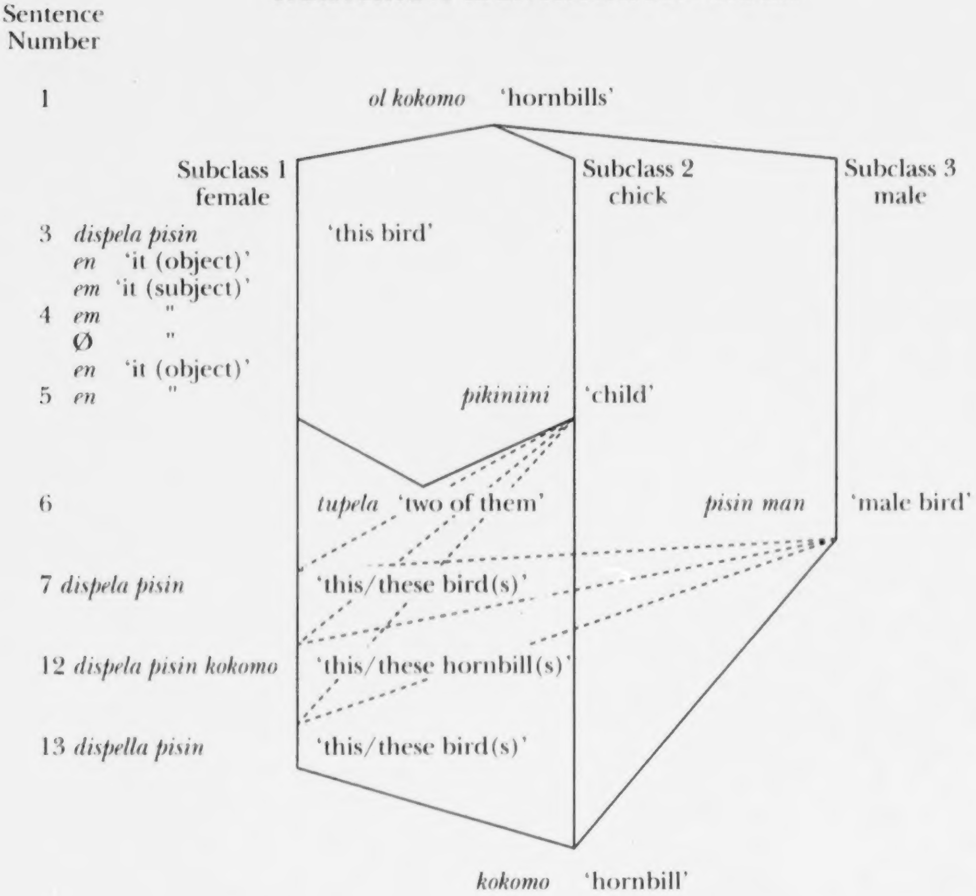
In Sent 5 there occurs a second aspect marker in the same slot in which *bai* occurs in Sent 3. It is *bihain* and also means incomplete (hence is compatible with Sent 3), but in addition means that the action is almost certainly to be completed (Scorza 1996).

In Sent 6 the Time Phrase *tu mun tri mun* 'two or three months' is a post-clause margin and refers only to the time of the action in its clause. The clause itself is within the time/aspect frame of Sent 3.

In Sent 12 there is a repetition of *bai*, so within P¶4 (Sentences 7–12) we would say that as a part of P¶1 it is governed by the time/aspect signaled in Sent 3, but as the last constituent of P¶4 *bai* signals a reinforcement of the aspect demonstrating the nuclearity of that sentence in relation to P¶4. A second element that gives prominence to Sent 12 in relation to other constituents of P¶4 is the full NP used for identifying the hornbill(s): *dispela pisin kokomo* 'the hornbill bird'.

Earlier we have stated that Sentences 13 and 14 comprise a paragraph within P¶3 rather than being a third constituent of P¶1 because of the

PARTICIPANT IDENTIFICATION CHART


Sentence Number
1
ol kokomo 'hornbills'
Subclass 1 female
Subclass 2 chick
Subclass 3 male
3 *dispela pisin*
en 'it (object)'
em 'it (subject)'
4 *em* "
Ø "
en 'it (object)'
5 *en* "
'this bird'
pikiniini 'child'
6
tupela 'two of them'
pisin man 'male bird'
7 *dispela pisin*
'this/these bird(s)'
12 *dispela pisin kokomo*
'this/these hornbill(s)'
13 *dispella pisin*
'this/these bird(s)'
kokomo 'hornbill'

difference in strength of segmentation of *na* 'and' (Sent 13) versus *sapos* 'if' (Sent 7). We still hold that judgment even though the aspect morpheme *save* 'know (habitual)' (Sent 14) occurs in the nucleus of the Point of Reference-Contrast¶.

3.2 IDENTIFICATION OF PARTICIPANTS OF THE DISCOURSE (SOME OF WHICH IS MORE PROPERLY DISCUSSED AS REFERENTIAL STRUCTURE THAN AS GRAMMATICAL STRUCTURE). First of all we mention the bracketing of the total discourse by the topic of the discourse, the hornbills. *Ol kokomo* 'hornbills' begins the discourse and *kokomo* 'hornbill' is the last word of the discourse. I understand that such bracketing is typical of New Guinea Pidgin discourses (Scorza 1996).

The first mention of HORNBILLS refers to hornbills in general: the specific term *kokomo* (Sent 1); but the next reference, in Sent 3, is the first subclass of *kokomo* in that the phrase *dispela pisin* 'this bird' is modified by 'the one that has an egg inside', hence refers to the female and uses the demonstrative pronoun *dispela* 'this' together with the more generic noun *pisin* 'bird'. In the same sentence the subject pronoun *em* and the object pronoun *en* refer anaphorically to the female hornbill. In sentences 4 and 5, once again, these two pronouns have the same referent. In addition Ø, also referring to the female, is used in *na Ø kar-im* 'and lays' because the subject may be omitted following *na* of a noninitial clause if the subject is the same as in the preceding clause. Also in Sent 5 there is a second subclass of *kokomo*: *pikinini* 'child'.

In Sent 6 a third subclass of *kokomo* is introduced: *pisin man* 'male bird'. Also there is a union of subclasses one and two in the form *tupela* 'two of them' referring to the female and the chick.

In Sent 7 *dispela pisin* 'this bird', which is the same phrase as used in Sent 3 referring to the female, is a bit ambiguous in that it could also refer to the chick as well as possibly to the male. We would need to ask the narrator to learn what he intends it to mean.

In Sent 12 occurs the full designation of the hornbill(s), *dispela pisin kokomo* 'the hornbill bird(s)', as mentioned above, to give more prominence to that constituent. In addition it could be because the hornbill(s) haven't been referred to in the four preceding sentences. At any rate, at least the female is being referred to, but whether or not the other two subclasses are, is not known.

In Sent 13 the phrase *dispela pisin,* now used for the third time, is used in the first IC of the Point of Reference-Contrast ¶ and most certainly refers to, at least, the female bird.

In Sent 15, finally, once again the more specific bird label, *kokomo,* refers to the general category of hornbill, thus ending the story as mentioned before. In the chart on the previous page the dotted lines indicate the ambiguous referents of the terms for the hornbills.

The reference to the second participant of the discourse is MEN. It is much simpler that for the hornbills.

In Sent 7 it is introduced simply as *man* and from there until sentences 13 and 14 is referred to by the pronoun *ol* 'they' or once in Sent 11 as Ø. In Sent 13 there is the subclass *manki* 'boy' which is in contrast to *ol bikman* 'older men' of Sent 14. This latter subclass which has the role of topic of Sent 14 is immediately referred to by the pronoun *ol* 'they' as the subject of the clause root.

4. GRAMMATICAL FEATURES OF THE V AND THE VP MARKER *I*.

4.1 The suffix *-im* is a transitivizer used with bitransitive and transitive verb roots. This is in contrast to transitive verbs which are single morphemes but do not occur with the suffix *-im*. This class is very small. Those occurring in this text are ***kaikai*** 'eat', ***tromoi*** 'throw', ***gat*** 'have', ***kakmap*** 'become'.

4.2 The predicate marker *i* is a very interesting feature of New Guinea Pidgin. Mihalic (1971:xiv) states, 'The predicate marker, professional linguists specializing in South Sea languages tell us, is a characteristically Austronesian particle. It does not derive from the English as a transcription of "him he"'. Verhaar (1995:70) further comments 'it marks the predicate and immediately precedes it. The function of *i* is to pick up, in the form of this particle, one particular kind of subject, either third person or a subject with some third person element in it'. It occurs following third person subjects of either nouns or pronouns. The specially interesting feature is that it occurs following first person exclusive, but not following first person inclusive. Thus we see that in New Guinea Pidgin the third person element of first person exclusive (speaker plus the other person minus the addressee) is marked grammatically. Such is not the case in many languages that have the difference between first person inclusive and first person exclusive. There are other environments with an element of third person in which *i* occurs, but are not relevant to this paper, nor is the phonologically conditioned instance that it is often deleted following a subject ending in a high vowel (Mühlhäusler 1990:237). *i* occurs 22 times in this text, but Lynch (Mühlhäusler 1990:239) says that the use of *i* is declining. From Sankoff (1986:269) we learn that children in urban areas are using the predicate marker much less frequently than earlier speakers.

5. USING EXPERIMENTAL SYNTAX (PIKE 1993), EARLY IN FIELDWORK, TO HELP IN ANALYZING A DISCOURSE. A text such as the hornbill discourse is very useful in early fieldwork in that it is a natural, nonelicited text. However, it has more complex structures than beginners can understand. The following procedure, experimenting with the syntax of the text, has proved to be very useful. The original text provides the context that a language helper can readily understand, hence the data that he gives in such elicitation are relatively reliable.

5.1 List every morpheme that may be either a noun or noun root, then elicit expansions of each member of that list into full nouns (if there are noun affixes in the language) and into full noun phrases.

5.2 List every morpheme that may be either a verb or a verb root, then using the noun phrases elicited above as arguments with the verbs, as well as clause margins such as time and place, investigators can elicit single verb clauses made up of data from a natural text. Care must be taken to try to change no more than one morpheme at a time so that conditioning factors may be more apparent. When these early data are understood, then more complex structures that approach the more complex structures of the original text can be elicited.

6. CONCLUSION. This simple text of the hornbills has served well to begin to understand some very important features of the grammar of New Guinea Pidgin: (1) some typical discourse features such as its segmentation into successively lower levels of paragraph within paragraph which in turn are made up of sentences, as well as their functional relation to each other, (2) some important time/aspect occurrences and constraints, (3) participant identification features, (4) a transitivizing verb suffix which occurs in bitransitive and most, but not all transitive verbs, (5) a distinctive particle marking the predicate whose subject is third person or has some element of third person such as first person exclusive (speaker + a third person-addressee).

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COMPARATIVE ANALYSIS OF SPOKEN AND WRITTEN NARRATIVES IN KOREAN

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1. Introduction. The idea that there are differences between oral and written discourse is not new (Chafe 1982, 1985; Hidi & Hildyard 1983, Tannen 1980, 1982, 1983, etc.). Tannen (1983:80–82) reviews two general hypotheses: the contextualization hypothesis and the cohesion hypothesis. According to the contextualization hypothesis, spoken language is highly context-bound because spoken discourse is typically spontaneous and face-to-face, while written discourse is decontextualized and typically expository. According to the cohesion hypothesis, for the establishment of cohesion, spoken discourse typically relies on paralinguistic and nonverbal channels, whereas written discourse relies on lexicalization.

Chafe (1982, 1985) argues that spoken and written language have two basic structural differences. First, spoken language has a fragmented quality, which results in part from the spurt-like nature of speech, whereas written language has a more integrated quality partly because writing is a deliberate and editable process. Secondly, spoken language exhibits a high degree of involvement because spoken language always assumes a social context and social involvement. Written language, in contrast, shows a high degree of detachment because writers are usually isolated from their audiences both spatially and temporally. Chafe argues that integration is achieved by a number of devices such as nominalizations, conjoined phrases and series of phrases, sequences of prepositional phrases, complement clauses, and relative clauses. In contrast, involvement is created by a number of devices such as pauses, requests for back-channel responses, specific details, direct quotations, and emphatic particles.

This present study examines the traditional claims about the differences between spoken and written discourse in Korean narratives. It is based on spoken and written narratives produced by Korean Georgetown University students, who were asked, in conversation, to tell an interesting experience, and later to write the story down. This paper will present the comparative analysis of spoken and written Korean narratives focusing on the three major distinctive natures: (1) fragmentation versus integration, (2) involvement versus detachment, and (3) morphosyntactic structure.

2. **FRAGMENTATION VS. INTEGRATION.** It has been argued that although almost the same information is expressed in both spoken and written discourse, spoken discourse is fragmented as a result of the spurt-like nature of speaking, whereas written discourse exhibits increased integration or compactness (Chafe 1982, 1985; Tannen 1982, 1983). The spoken narratives in this study are much longer than their written versions. For example, the spoken narrative [SP1] contains 85 units of speech, whereas the written story [WT1] contains 41 sentences. The spoken narrative [SP2] also contains 123 units of speech, whereas the corresponding written story [WT2] contains 27 sentences. Among the features, which most contribute to the distinctive nature of fragmentation versus integration quality of spoken and written narratives respectively, three features will be discussed in this section: pauses, false starts and reversed word order, and filler discourse markers.

2.1 **PAUSES.** Pauses are more frequently found in spoken narratives than in written narratives. For example, in [Excerpt 1], Sunhee has 6 pauses when she says that what she felt, while participating in the play, was that she was a person who lacks emotions. She however has no pause in the written version.

[Excerpt 1]

[SP1] *(28) Kulentey hamyense nukinkesun, nayka uhh..... kancengi epstanunkeseyo. (29) Melisokulonun koyngcanghi ku sanghwangul cal ihayhako.... ehhh cakpumel calpaakhako issunkes kakhuntey.....maksang ku kamcungul uhhhh..... pyohyun hallyukohamyon..... ku kessi cal antoeyo. (30) Kulayse...... nukinkesi uhhhh hyuntayintul-i kamcungi epstanun kesi maxnun iyaki lanunkeyo.*

TR: (28) What I felt, when I was participating in the play, is that I am uhh..... a person who lacks emotions. (29) I understand the situation very well, and ehhh...... I analyze the work very well..... but when I try to express emotions......that is not easy. (30) So.....I felt that euhhhh...... the claim that modern people are emotionless is right.

[WR1] *(23) Yenkukul hamyonse nukkinkessun nayka kancuñgi maymalla isstanun kessiessta. (24) Yeunkuke ku sanghwangel ihaynun haciman kancengulo phyohyunhalswu epsessta. (25) Ku cenenun nukkici moshayten kulen kamcengiessta.*

TR: (23) What I felt, when I was participating in the play, was that I was a person who lacks emotions. (24) Although I understood the situation, I was not able to act them with emotion. (25) It was the realization of thought I had not felt before.

During the pauses, Sunhee can control the information that she will present.

2.2 FALSE STARTS AND REVERSED WORD ORDER. The word order in Korean is relatively flexible and free, but the typical word order is subject + object + verb. However, in fast speech, a story-teller sometimes makes false starts and reverses word order. For example, in [Excerpt 2] about one of her classmates, Eunsun makes an utterance without an object, and she states the object in the following utterance.

> [Excerpt 2]
>
> [SP2] (6) *Kuttay meeting-han chinkwuka kongkyolyopketo nalang kathen hakyoe kake tonkesissco.* (7) Kunte myospen mannassesstakuyo. (8) kuelul. (9) tukehan e-iess-ci. (10) *eccasstun meeting-ul kyesok mannasseyo.*
>
> TR: (6) It was strange that the person, whom I met at the meeting, and I entered the same university. (7) *Then we met a few times.* (8) *That guy.* (9) *A very strange guy.* (10) Anyway, I met him at the meeting twice.
>
> [WR2] (3) *Meeting chespenccay partner-ka classmate-ka toenun happeng-to maspomyense.*
>
> TR: (3) I happened to have a partner at the meeting as a classmate later.

Utterance (8) *kuelul* 'that guy', which is the object of (7), can be placed before the verb + sentence final ending *mannassesstakuyo.* In contrast, the written version has the usual word order.

2.3. FILLER DISCOURSE MARKERS. Spoken discourse uses various discourse markers. In Korean spoken narratives there are words which function not only as discourse markers but also as fillers. They occur not only at the beginning and end of utterances but also within the utterances, and they do not convey particular meanings. In this study they are referred to as filler discourse markers. Two filler discourse markers which are frequently used in the spoken narratives are *meo* and *kunyang,* both of which are close to English 'well' and 'you know'. For example, in [Excerpt 3], when Eunsun talks about her English placement test at the summer study abroad program, she employs the filler discourse marker *meo* three times in the spoken narrative, but never in the written version.

> [Excerpt 3]
>
> [SP2] (42) *Yeunsukakaciko,* meo, *kukise sihemchicanayo?* (43) *English course pannanuntako. pannanuese tulekako.* (44) Meo *changpihaci anhel cengtonun telekasssenikka.* (45) *Kuki salamtul cungese.* (46) *Kulaykaciko nonunkeci* meo.

TR: (42) I went to the exchange program, and *well,* there was a placement test, wasn't there? (43) To place students into an appropriate English class, and for students to be enrolled in a class. (44) *Well,* I was placed at the level of class, in which I did not have to be uncomfortable. (45) Compared with other students there. (46) And then, we just had a fun, *you know.*

[WR2] (10) *Language course-nun sihemul thonghay pani naneoessko, changpihaci anhel cengtoe level-e sokhacessko.*

TR: (10) The class for a language course was divided up according to the test result, and I was placed at the level, in which I was not uncomfortable.

While using the filler discourse markers, a story-teller can hold the conversational floor and control the information.

The use of filler discourse marker *kunyang* is demonstrated in [Excerpt 4]. When Eunsun talks about one of the male students, she employs the filler discourse marker *kunyang* three times and *meo* once. She however does not mention the student in the written version.

[Excerpt 4]

[SP2] (54) *Kuki kan salamcunge yenge kwengcanghi calhanun salam issesstkuyo.* (55) *Acessilako pulesstakuyo.* (56) *Naika wulipota com 5-ssal 6-ssal winte weo kuttaypomyon acessi kathkasseyo.* (57) *kyunghonto hassko kulenikka* kunyang. (58) *Tak-acessieyo.* (59) *Kika kwengcanghi cokumhay.* (60) *Namanhay.* (61) *'Tak-acessi kase yenghwa poko iyakihayceyo'.* (62) *kulikonasae kuttayto nanun nolkwu* kunyang. (63) *kulaykaciko* kunyang… *kulehke haku.* (64) *Meo chungsilhakenun anhasseyo.*

TR: (54) There was a person, who spoke English very well in the exchange program. (55) We called him an uncle. (56) He was 5 or 6 years old than us and he looked kind of an uncle. (57) Also because he was married at that time, *you know.* (58) We called him uncle Tak. (59) He was very small. (60) Like me. (61) I said to him, 'Uncle please tell me after you watch the movie', (62) And I had fun with other friends, *you know.* (63) And then *you know…* It was like that. (64) Well, I didn't do with my best.

In (57) and (62), *kunyang* 'you know' occurs at the end of the utterances, and in (64) *meo* 'well' occurs at the beginning of the utterance.

3. INVOLVEMENT VS. DETACHMENT. Chafe (1985) claims that spoken language exhibits a high degree of involvement and reliance on immediate context

because spoken language always assumes a social context and social involvement. Written language, in contrast, shows a high degree of detachment because writers are usually isolated from their audiences. Among the features, which contribute to the distinctive nature of involvement versus detachment in spoken and written discourse, five major features will be discussed in this section: deictic modifiers, emphatic particles, paralinguistic cues, requests for back-channel response, and direct quotations.

3.1 DEICTIC MODIFIERS. In spoken discourse, a speaker can freely rely on the immediate context and use deictic modifiers. For example, in [Excerpt 5], when Sunhee compares different social relationships among Americans and Koreans, she refers to the U.S. with the deictic modifier *yeuki* 'here' in (54), (56), and (59).

> [Excerpt 5]
>
> [SP1] (54) Yeuki *wase ceil himtulesstunkesun, salamtuli tepule salci anhnuntanunkes.* (55) *Seoul salamtulun hankuk salamtulun tepule salunkese iksukhay issnunkes kathayyo.* (56) *Meotunci* eykinun *meotunci kayincui hacanhayo?...* (59) Yeuki *wasenun kulen sayngkak manhi haypoasseyo.* (60) *modutul caki... cakiil.*
>
> TR: (54) What I felt most difficult after I came *here* (U.S) is that people do not have close contacts with each other. (55) People in Seoul, Korean people tend to have close contacts with each other. (56) People *here* do things according to individualism, don't they?... (59) After I came *here*, I have thought about it many times. (60) Everyone is interested in himself... his own concerns.

Sunhee may directly mention 'America', but by the use of the deictic modifier *yeuki* 'here', she demonstrates her reliance on the immediate social context.

3.2 EMPHATIC PARTICLES. Both spoken and written narratives demonstrate the use of emphatic particles such as *koyngcanghi* 'very' and *nemwu* 'very/really'. However, in spoken narrative, a story-teller interacts with a listener and often expresses his own feelings by the repetitive use of emphatic particles. For example, in [Excerpt 6], in (22) Sunhee describes difficulties in taking a role in the play with the repetition of *nemwu*. In (35), she also states the authoritative environment of the medical school with the repetition of *koyngcanghi*.

[Excerpt 6]

[SP1] (22) *Kulenikka, nayka ku-salam-i toyatoy-ko, ku cwuinkong-i toyatoy-ko,* nemwu nemwu *himtultulakwuyo...* (35) *Kuliko tto eutaynun* koyngcanghi *kwenwicwuika* koyngcanghi *kanghayyo.*

TR: (22) Because I had to be that person, and I had to be the main actress, it was *really really* difficult... (35) And in medical school, authoritative atmosphere is *very* strong, *very.*

[WT1] (22) *Yenkuk yensupun swipcimun anhassciman* nemwu *caymiissko hungmiissnun koacengiessta.*

TR: (22) The practice for the play was not easy, but it was *very* interesting and a fun process.

She however employs the emphatic particle *nemwu* only once in the written version [WT1]. Thus, emphatic particles are repeatedly used in spoken narratives.

3.3 PARALINGUISTIC CUES. Spoken discourse has a face-to-face interactive nature, so it exhibits the speaker's use of paralinguistic cues such as tone of voice, laughter, and facial expressions. For example, in [Excerpt 7], when Eunsun talks, in a playful tone of voice about her friend from Boston, she continues laughing and provokes laughter from the listener.

[Excerpt 7]

[SP2] (76) *Mechsi pihayngkilul thasseya hanunte i yuhaksayngi cakinun antakochiko map-eul poassnunte kilel icepeliko.* (77) *pame kulayse kanikka pihanegkinun ttenapeliko kulayse moskasseyo.* [laughs] (78) *Kulayse cakwu kutaumnal kakwu* [laughs] (79) *Kulenikka cumale onkeya nolle.* (80) *moskasscimoe.* [laughs] (81) *Kulenilto issessku.*

TR: (76) The student was sure that he knew the time for the flight back to Boston, and he looked at a map, but in the evening we lost the way to the airport. (77) When we finally got to the airport, the flight had already departed, so he couldn't fly to Boston. [laughs] (78) So he spent the night in Berkeley and flew to Boston the next day. [laughs] (79) He came to see us on weekends. (80) And he couldn't go back to Boston. [laughs] (81) It happened.

By using paralinguistic cues such playful tone of voice and laughter, Eunsun can make her story more vivid.

Another example of the paralinguistic feature of spoken narrative is the speaker's facial expression. In [Excerpt 8], Eunsun speaks with disappointment when she says that she did not have time to go shopping when she had some money from her father's friend.

[Excerpt 8]

[SP2] (103) *Kulente ku taumnal acessilul mananikka cunun toni 100-pulinka meo cutekakuyo.* (104) *Yongton ssulako.* (105) *Kulente meo ku kaumnal ttenanuntey ssulteka isseyaci.* [a look and voice of real disappointment] (106) *meo soksanghankess isscyo.*

TR: (103) When I met him (my father's friend) the next day, he gave me something like 100 dollars. (104) To spend. (105) But because we had to leave L.A the next day, I couldn't spend the money. [a look and voice of really being disappointed] (106) I was disappointed, as you can imagine.

Because of the face-to-face interactive nature of the spoken discourse, the story-teller thus can express her own feelings.

3.4 REQUESTS FOR BACK-CHANNEL RESPONSE. In spoken narrative, a story-teller can interact with a listener and request back-channel responses or confirmation. For example, in [Excep 9], when Sunhee argues that, whereas Americans tend not to pay much attention to others, Koreans are more interested in one another, she requests back-channel response and confirmation. After she makes this claim, she makes three tag-questions in (64), (65), and (67), and she requests back-channel confirmation from the listener.

[Excerpt 9]

[SP1] (61) *Molukesseyo.* (62) *ceka calmos sangkakhako issnunci.* (63) *Kuleciman yeki salamtulun peulo namsangkak anhako.* (64) Tto kulechanayo? (65) *Seoul salamtulun namsangkakul manhi ha*-canayo? (66) *'Nayka ilehkeyhamyon nami ettehke sangkakhalkka?'* (67) *Kulayse eyttenttaynun mak ilehke hangtonghako sipunteto anhako,* kulenkes isscanayo? (68) *Nayka naymamtelo ansanunkes.* (69) *Kulayse eytten salamtulen puphenhakesstako kulayyo.*

TR: (61) I don't know. (62) Maybe I am thinking wrong. (63) But people here don't pay much attention to others. (64) *It's right, isn't it?* (65) People in Seoul are concerned with others very much, *aren't they?* (66) They tend to think 'If I do it like this, what others may think about it?' (67) So even when they would like to act this way, they don't do like that. *It happens, doesn't it?* (68) I do not live according to my own will. (69) So some people here say that that would be inconvenient.

After making claims, Sunhee makes tag-questions in (64), (65), and (67).

3.5 DIRECT QUOTATION. It has been claimed that spoken discourse typically demonstrates more direct quotations than written discourse (Chafe 1982; Song 1993; Tannen 1982, etc.). However, it is found in Korean that both spoken and written narratives demonstrate extensive use of direct quotations. For example, in [Excerpt 10], when Sunhee talks about what her American friends told her regarding Koreans' social behavior, she produces direct quotations.

[Fxcerpt 10]

[SP1] (70) *Mikwuketulilang iyaki manhi haypoasseyo. Kukesse tayhayse.* (71) *Mikwuketulun* 'Yettekke kulekheysanya?' *lako napoko.* (72) 'Kulenikka, nemwu himtulci annya?' *lako.* (73) 'Kelehke i-salam sayngkakhako, ce-salam sayngkakhako, pwumo sayngkakhako, nwukwu sayngkakhako, yettekke sanunya?' *lako.* (74) 'Ne-ka coemyen ne-ka hako sipuntelo hanunkeci we nam sayngkakul hanunya?' *ikeci.* (75) 'Ne samici name samun anici anhnunya? (76) Taysin sanunkes anici angnunya?' *ko.* (77) *Kunte acik ikose kutenkese iksukhay issci anhki ttamune kulenci cenun acik hankukpangpepi cohenkes kathhayo.*

TR: (70) I have talked with American students about this matter many times. (71) American students say to me *'How do you live like that?'* (72) They say *'Is it too difficult for you to live like that?'* (73) They say *'How do you live if you have to be concerned about this person, that person, your parents, and someone else?'* (74) *'If you like, you have to do as you want. Then why are you concerned so much with others?'* (75) They say *'It is your life, not another's, isn't it?'* (76) And they say *'You don't have to live for others, do you?'* (77) But because I am not much accustomed to this kind of thinking here in America, I kind of like the way of Korean people.

Sunhee presents what her American friends told her in five direct quotations and makes her story more vivid. However, she does not state what her American friends told her in the written version.

The use of direct quotations in both spoken and its written counterpart is demonstrated in [Excerpt 11]. When Sunhee states how she felt when she entered a university, she presents what she said to herself in a direct quotation in both speaking and writing.

[Excerpt 11]

[SP1] (2) *Seoul-esenun hangsang kuleuhtusi, kotunghakyo-ttaynun kyongcanghi kongpwuhantako himtulko.* (3) *kulayse ttak tayhake tulekacamaca* 'Ah, icenun kongpwuhacimalko ilnyun tongan hacimalko nolca! (4) Meol hako nolkka?' (5) *Kunteycircle-ul tulessnuntey yenkukpanul tulesseyo.*

TR: (2) High school students in Seoul usually study very hard. (3) So when I entered a university, I said *'Oh, I won't study for this first year, and I will have fun!* (4) *So what could I do?'* (5) I joined the circle, a drama club.

[WR1] (5) *Kyelkuk nanun tayhak 1-nyensayngi toessta.* (6) *Tutkiman hayto kasumpekchan tayhak 1-nyensayng.* (7) *Nanun sayngkakhaessta.* (8) 'Ol hanhaynun kongpwunun sinkyenanssuko culkimyense cenayyaci!' hako. (9) Kulayse chachunkesi yenkukpaniessta.

TR: (5) Eventually I became a freshman. (6) The first year made me think of having fun. (7) I told myself. (8) 'For this first year, I won't care much about studying, and I will just have fun!' (9) So I decided to join the drama club.

While presenting direct quotations, Sunhee can indicate her desire to do something else during the first year.

Furthermore, written narratives demonstrate direct quotations even when spoken counterparts do not exhibit direct quotations. For example, in [Excerpt 12], Sunhee presents in a direct quotation what she said to her parents, who disagreed to her active participation in the drama club activities.

[Excerpt 12]

[WR1] (10) *1-hakkittaynun pyello yenkukpan hwaltongul haci anhassessta.* (11) *Eyunun pwumonimi pantayhasiesski ttaymwunita.* (12) *Nan encyena* 'yenninun yenkukhanuntey cenun woe antwocyo?' *hako yeccyepoassta.*

TR: (10) I did not actively participated in the drama club activities during the first semester. (11) The reason for this was that my parents disagreed. (12) I always said to my parents *'My sister got to play in a play, why can't I?'*

While constructing a dialogue, Sunhee can strongly express her desire to participate in the play.

3.6 DETAILS. Spoken narratives demonstrate more details because a narrator considers responses from a listener and provides further details and information. For example, in [Excerpt 13], when Sunhee points out the authoritative atmosphere of the medical school, she describes the instances of that in details.

[Excerpt 13]

[SP1] (35) *Kuliko tto eutaynun koyngcanghi kwenwicwuika koyngcanghi kanghayyo.* (36) *Kunteycirlcle-eseto eutay circle-esenun kwonhicuhiul manhi chassayo.* (37) Kulayse senpayka omyen tali kkoko ancitomoshako, ilesese insahayyatoeko. (38) Senpayka yatanchimyen cakika pyullo calmoshankes epseto kamanhi tutko isseyatoeko. (39) *Kunteyce circle-un kulenkeyeps-eyo.*

> TR: (35) And in medical school, the atmosphere is very authoritative, very. (36) Among circles, a medical school circle is much more authoritative. (37) *So when a senior comes to a junior, a junior can't continue sitting with crossed legs, and a junior has to stand up to greet them.* (38) *And when a senior miscriticizes a junior, a junior has to listen calmly even though he hasn't done anything wrong.* (39) But my circle is not so authoritative.

In (37)–(38), Sunhee provides two instances in detail. This segment is a digression from the main story, and it is not found in the written version.

4. MORPHOSYNTACTIC STRUCTURE. Spoken narratives demonstrate relatively simple morphosyntactic structures because the speaker tends to rely on juxtaposition of propositions, or on the basic conjunctions. The written narrative, in contrast, includes more complex syntactic structures such as relative clauses, complement clauses, and nominalizations. The differences between spoken and written Korean narratives will be discussed in this section with focus on three major features of morphosyntactic structure: simple versus complex sentence structure, repetition, and parallel construction.

4.1 SIMPLE VS. COMPLEX SENTENCE STRUCTURE. The speaker's use of simple syntactic structure in spoken narrative and the complex syntactic structure in written version is demonstrated in [Excerpt 14]. In the spoken narrative [SP2], Eunsun makes a simple sentence structure, whereas in the written counterpart, she makes a relative clause and more complex compound sentence.

> [Excerpt 14]
>
> [SP2] (35) *3 hakneyn yelumpanghaktte yenswulul kake toesstakuyo.* (36) *Yenswulul momi apase ankallyeko kulass*-nuntey *kwangkoka nasseyo.* (37) *momi apase ankallyeko hat*-nuntey, *kyoswu 2 myongi insolhayseka*-ko, *sihem yengesihem po-asse pass-hayyato*-ko, *hakkyoese hwaksilhi pocanghaycu*-ko, *camekyulyen macese kanunkessinikka.*
>
> TR: (35) I could join the exchange program during summer vacation in my third year. (36) I did not plan to join the exchange program because I was sick, *but* there was an announcement. (37) I did not plan to join the exchange program because I was sick, *but* two professors will be coordinators, *and* students had to take an exam, *and* pass an English exam, *and* the university supported the program, *and* it was an exchange program with a sister institution.

[WR2] (4) *Tayhak saynghwalcwung kacang kiekey namnun ilun 'Berkeley yenswu' ita.* (5) *Wuli tayhakkwa camaykylyenel mayce yenswu team-ul hakkyoese mociphal-*ttay, *nanun kenkang kwankelo yenswuonunkesul phokihass-*nuntey, *chinwue kweyuwa hakkyolopwute yakkanei towum tekpwun-*ulo *yenswuei kile ollassta.*

TR: (4) The event, which is the most memorable event during my university days, is 'my summer study abroad at Berkeley'. (5) *When* the university recruited a group for the study abroad at a university, which was a sister institution of our university, *although* I gave up first to go because of my health condition, I finally joined the exchange program *because of* my friend's suggestion and a little of support from the university.

In [SP2], utterance (37) is composed of 5 clauses, which are connected by the conjunctions *nuntey* 'but' and *ko* 'and'. In contrast, in [WT2] (4) has a relative clause and (5) is composed of 4 clauses, which are connected by *ttay* 'when', *nuntey* 'although/but', and *ulo* 'because of'.

4.2 REPETITION. Another difference between spoken and written narratives is the abundance of repetition in the spoken version. For example, in [Excerpt 15], Eunsun repeats *momi apase ankallyeko kulassnuntey* 'I didn't want to go because I was sick' twice in the spoken narrative, whereas she states it only once in the written version.

[Excerpt 15]

[SP2] (36) *Yenswulul* momi apase ankallyeko kulassnuntey *kwangkoka nasseyo.* (37) momi apase ankallyeko kulassnuntey *kyoswu 2 myongi insolhaysekako sihem, yengesihem poasse pass-hayyatoyko, hakkyoeyse hwaksilhi pocanghaycwuko, cameykyulyen macese kanunkessinikka.*

TR: (36) *I did not plan to join* the exchange program *because I was sick,* but there was an announcement. (37) *I did not plan to join the exchange program because I was sick,* but two professors will be coordinators, and students had to take an exam, and pass an English exam, and the university supported the program, and it was an exchange program with a sister institution.

[WR2] (5) *Wuli tayhakkoy camaykeylyenel mace yenswu team-ul hakkyoeyse mociphalttay* nanun kenkang kwankelo yenswuonun kesul phokihassuna *chinwue kwonyuwa hakkyolopwute yakkane towum tekpwunulo yenswue kile ollassta.*

TR: (5) When the university recruited a group for the study abroad at a university, which was a sister institution of our university, although I first gave up going because of my health condition, I finally joined the exchange program because of my friend's suggestion and a little of support from the university.

The repetition in the spoken narrative can contribute to the nature of involvement, whereas a statement in the written version contribute to the nature of integration.

4.3 PARALLEL CONSTRUCTIONS. It has been pointed out that spoken discourse uses more parallel constructions than the written does. Spoken discourse demonstrates a parallelism, which results from the sequences of similar syntactic constructions and lexical items, while written discourse demonstrates that the list is collapsed or integrated. For example, in [Excerpt 16], Sunhee argues that people in Korea tend to do more things with other people. She repeats the word *kathi* 'together' 4 times and makes parallel constructions.

> [Excerpt 16]
>
> [SP1] (57) *Kuntey Seoul-un etil* -ka-*to* kathi-*ka*-ko, *meoul-hay*-to kathi-*ha*-ko, *yaykil-hay*-to *kule*-ko, kathi-*ha*-ko, *hangsang* kathi *hacanhayo.*
>
> TR: (57) In Seoul, *when* we go out somewhere, we go *together with someone, and when* we do something, we do it *together with someone, and* even *when* we talk, we do it *together with someone,* we always do things together *with other people.*

In other words, Sunhee makes a parallel construction of *ka/ha(y)-to kathi-ka/ha-ko* 'go/do - when together-go/do - and', and claims that when people go somewhere or do something, they always do so together with other people.

Another example of parallel constructions is [Excerpt 17], in which Eunsun claims that her summer study abroad program was a turning point in her life. Eunsun constructs parallel constructions in the spoken narrative, but not in the written version.

> [Excerpt 17]
>
> [SP2] (114) *tto yuhakkkacion keykika toycianhassna sayngkaki toyketunyo.* (115) *Meo hankwukkase nay chinkwulang te chinhaycikwu.* (116) *Kulenikka hakwonto tanikey toykwu.* (117) *Ku taumey kulenkecyo meo.* (118) Eunge-to *com haypolkka sayngkakhaypokwu.* (119) *Yuhak-to* com haypolkka sayngkakhaypokwu. (120) Ah, mikwuk *saynghwalilanunkey ettenkekuna.* (121) cezzok *saynghwalilanunkey ettenkekuna.*
>
> TR: (114) It motivated me to study in the U.S. (115) This is the way I feel. (115) Well, I became closer to my friends when I returned to Korea. (116) And I began to take courses at a private institute.(117) And well, something like that. (118) *I thought about whether I would study English.*

> (119) *I thought about whether I would go study abroad.* (120) [I thought] *Ah, it is what the American lifestyle is about.* (121) *It is what the lifestyle there* [America] is about.
>
> [WR2] (23) *Kwakelul cenglihako saylowun sayngwalul sicakhakehanun yuhakey tayhay sayngkakhakey toyeessko yengekongpwulan ettehke hanunkesici nayka mannanun chikwutulkkacito tallacessta.* (24) *kathi yenswuwasten chinkwutulkoa chinhayce colepkkaci 3-hakkitongan cengsinepsi culkepkey poneyssta.* (25) *Kyelkwukun 'mikwuk yenswu'ka cikume nay chinkwutelel kakkapke haketoynun kyekilul pwuyehayessko ttohan onulnal nayka ikosese yuhaksayngwalul hakekkum hayessta.*
>
> TR: (23) It made me..., have a new way of living, and think about studying abroad and how to study English, and it even changed friends whom I met. (24) I became closer to the friends, who joined the study abroad program with me, and we had fun for the three semesters till our graduation. (25) 'The study abroad program' consequently gave me motivation to get closer to my friends, and it made me now study here in the U.S.

In the spoken version, in (118)–(119), Eunsun makes parallel constructions of *com haypolkka sayngkakhaypokwu* 'I thought about whether I would' with the insertion of the object *eunge-to* 'English' and *yuhak-to* 'study abroad'. In (120)–(121), she also makes another parallel construction of *sayngwalilanunke ettenkekuna* 'what is like the life of' with the insertion of *mikwuk* 'America' and *cezzok* 'there'. In contrast, she does not make any parallel construction in the written version.

5. CONCLUSION. I have compared spoken and written narratives in Korean with focus on the three major distinctive natures: fragmentation versus integration, involvement versus detachment, and morphosyntactic structure. This comparative analysis generally confirms the traditional claim on the differences between spoken and written discourse and narrative. The present study however demonstrates that Korean narratives, both spoken and written, demonstrate extensive use of direct quotation, repetition, and parallel construction.

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AN ALTERNATIVE ACCOUNT OF LANGUAGE STYLE AND CODE CHOICES: AUDIENCE DESIGN AND SPEAKER ORIENTATION

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1. INTRODUCTION. Bell's classic paper (1984) on language style as audience design[1] has attracted a great deal of attention over the years. After questioning the validity of Labov's proposal that style shift is the product of one factor: 'Style can be ranged along a single dimension, measured by the amount of attention paid to speech' (Labov 1972:208), Bell argues for what he calls 'the style axiom' (p. 151), which posits that 'speakers design their style for their audience' (p. 159), i.e., 'style is essentially speakers' response to their audience' (p. 145). Bell also argues that bilingual or bidialectal code choices can be accounted for by audience design as well (p. 145). Bell's theory, built on linguistic accommodation theory of Giles and his colleagues (e.g., Giles & Smith 1979), has been very influential in sociolinguistic studies on stylistic variation, but the reception of his theory has not been entirely uncritical. Based on her longitudinal study of variation in the production of Trinidad Creole and Standard English verb forms by three preschool children in the Trinidad sociolinguistic complex, Youssef (1993) argues that audience-oriented speech is not always conditioned by the addressee, but by the child's discernment of which person is of primary importance for him or her among the group of listeners.[2] Finegan and Biber (1994:336), based principally on sociolinguistic insights of Labov (1972), Kroch (1978) and Bell (1984), have made four observations in regard to social and style variation:

A. Certain linguistic features serve to mark both dialect and social situation.
B. Patterns of linguistic variation across situations of use within a speech community and patterns of linguistic variation across socially ranked status groups in that community are parallel.
C. Patterns of linguistic variation across situations of use within a speech community are systematic, with more 'literate' situations typically exhibiting a more frequent use of explicit and elaborated variants, and more 'oral' situations exhibiting a more frequent use of economy variants.

D. Patterns of linguistic variation across socially ranked status groups within a speech community are similarly systematic, with higher-ranked social groups exhibiting more frequent use of the elaborated and explicit variants and lower-ranked groups exhibiting more frequent use of the economy variants.

They argue that Bell's theory offers an explanation for the parallel patterns of variation across registers and dialects (observations A and B[3]), but it does not address the internal systematicity of register variation (observation C) and of social dialect variation (observation D). Rickford and McNair-Knox (1994), drawing from their two most recent interviews with Foxy Boston, an 18-year-old African American teenager in East Palo Alto, a multiethnic, low-income community located just east of Stanford University, argue that Bell's hypothesis of audience-influenced style shift does not fare well, since the amounts of Foxy's zero shift caused by addressee differences range from 22 percent (zero *is*) to 30 percent (zero *is* + *are*), while the amounts caused by topic change within each interview are much higher: 75 percent for zero *is* and 73 percent for zero *is* + *are* (for details, see Rickford & McNair-Knox 1994:258–60).[4] Ladegaard (1995) argues that the explanation provided by audience design appears to be too static, and he argues for persons, roles and power relationship between interactants in speech situations.[5]

In this paper, I will first address the adequacy of language style as audience design from the perspective of societal norms governing Mao Zedong's[6] (Mao's henceforth) conversational style and of code choices as audience design using the data I gathered while attending a Spring Festival party in 1994. I will then discuss Bell's theory from the perspective of code-switching due to language attrition. Finally, building chiefly on Bell's (1984) theory and Finegan and Biber's (1994) arguments, I will propose that language style and code choices derive from considerations of the nature of audience, societal norms, functions, situations and status.

2. THE ASSUMPTION OF AUDIENCE DESIGN REEXAMINED. In the light of Bell's (1984) language style as audience design, we would expect that Mao's conversational style would vary when he was talking to his bodyguard or to a well-known Western journalist. But this was not the case. Mao's conversational style did not seem to vary according to different audiences. His 'imposing' style was evident in the following dialogue that he had in winter 1957 with his security guard Sun Lianzhong (Leung & Kau 1992: 804):

Mao: Is it easy to study [physics and algebra]?

Sun: Physics is easy because it deals with things we do personally and things we can see; it is also easy to remember. Algebra, however, is difficult.

Mao: You *must* study algebra well! Many of the calculations in physics and chemistry have to be done with algebra. *If you don't study algebra well, you won't do well in physics and chemistry either. Don't be afraid of difficulties.* (italics all added)

Sun: We are not afraid of difficulties. We will certainly study well.

When he talked to Sun, Mao was giving orders or instructions instead of having a conversation involving 'give and take' or 'social negotiations' (Schiffelin 1990). This was evidenced by the use of *must* and the structures of *If you don't... you won't* and *Don't.* Mao's conversational style remained constant even when he was talking to a Western writer. The following is part of a conversation that Mao had on November 11, 1956, with Gunther Weisenborn (GW in short), a well-known German writer (Leung & Kau 1992:152–53):

GW: I am going to write a book about my trip to China.

Mao: You *should not* write only about positive things, but *should* write about the negative things in that book. It is important also to point out the shortcomings...

GW: Is it possible for other West German authors to visit China?

Mao: Of course. No matter which West German author, as long as he or she wants to come, may come and may stay for as long as he or she should want to, one or two or three months. We can invite them to come. Those who do not want to be invited can also pay for their own passage. *No matter what, no one starves in China.* All writers can come—writers of the Left, center, and Right, even people who are against China. *Let all of them come see for themselves.*

GW: No, it is probably better not to let them all come; I don't think this is right.

Mao: *No, it is right to let them come.* In every country, there are people on the Left, people in the center, and people on the Right. (italics all added)

The use of *should* and *should not* and other linguistic features such as *let all of them come see for themselves,* since *no matter what, no one starves in China,* and Mao's refusal to admit that he is wrong (*No, it is right to let them come*) all speak for Mao's invariant 'persuasive' style despite the fact that his audience this time was not his security guard. Mao's invariant conversational style has a great deal to do with the Chinese concept of *dengji*[7] ('social stratification'), which could be traced back to the Confucian rhetoric for the ruler-subject relationship

(Knapp 1992:vi), dictating that social harmony can be achieved only when persons of lower social status (e.g., subjects) obey the order of persons of higher status (e.g., rulers). The Confucian rhetoric fits nicely with Mao's instruction: persons of a lower rank should obey the order of persons of a higher rank, and all party members should obey the order of the Central Party Committee (Mao 1972). Though Mao did not state explicitly that the Central Party Committee should obey the order of its leader, this was taken for granted by Chinese people. Since Mao was the leader of the Central Party Committee, he was Almighty, and everybody was under his rule or control. Thus language style as audience design was simply not relevant for Mao under the norms of Chinese social stratification.

Examples of Mao's invariant conversational style present cross-cultural evidence that certain language style is culture-specific and speaker-oriented instead of being designed in the light of audiences. This observation could enrich Finegan and Biber's four observations, since it was not addressed in their paradigm. Hence observation E to follow observations A–D discussed previously:

E. Certain linguistic features are culture-specific and speaker-oriented.

By 'culture-specific and speaker-oriented', I mean that certain cultural constitutions do not require speakers to design their speech in the light of their audiences. Rather, speakers 'orient' their speech in accordance with their respective normative structures, as in the case of Mao's conversational style.[8] Thus, observation E, simple as it is, appears to add richness to the repertoire of style observations.

It is worth pointing out here that societal norms can also govern code choices among bilinguals. A fitting example is Gibbon's (1987) study of Chinese students at the University of Hong Kong. The social rule stigmatizes the use of English among Chinese students at the University of Hong Kong, where switching to English could be perceived as *fassn wai* 'it turns my stomach' or *suhng yéuhng* 'admires the West' (Gibbons 1987:30).[9] All this indicates that instances of communication behavior are never free of the cultural belief and action systems in which they occur (Hymes 1972a, cited in Schiffrin 1994:8).

3. CODE-SWITCHING AS AUDIENCE DESIGN REVISITED. Bell (1984) argues that 'audience design also accounts for bilingual or bidialectal code choices' (p. 145). This is basically the position of speech accommodation theory (Giles et al. 1987). Speech accommodation theory (SAT) is a model accounting for style variation in speech on the basis of the speaker's social psychological adjustment to the addressee. Giles et al. suggest that, in many social interactions,

speakers desire their listeners' social approval, and use modification of their speech towards listeners' code as a tactic to gain their approval (i.e., convergence). But in other situations, speakers may wish to disassociate themselves from listeners by accentuating their linguistic differences (i.e., divergence).

While code-switching as audience design has been documented in some of the speech communities, it does not mean that it accounts well for bilingual or bidialectal code choices that occur in other speech communities. Code-switching as an expression of 'humor' is a fitting example.

Siegel (1995) reports that humor is provided simply by the switch from Fijian to Hindi. Siegel explains that Hindi is not normally used for communication among Fijians, so when a Fijian switches to Hindi among other Fijians, it is almost always a clear signal to the Fijian listener(s) that the speaker is joking. The switch from one dialect to another for humor has been extensively documented in the literature. Blom and Gumperz (1972) report that in Norwegian the local Ranamål dialect is used for humor instead of the standard Bokmål. Rubin (1970) notes that Guaranti rather than Spanish is used in Paraguay for joking. In an Australian Aboriginal community, Gurindji rather than Kriol is used for humor in joking relationships (McConvell 1985, 1988). Examples of dialect humor are also found in Farsi (Saville-Troike 1989:188) and Fiji Hindi (Siegel 1987:209). Ferguson (1959) states that when a particular variety of language is considered appropriate for humor, it is often an informal variety, say, a local dialect in a situation of classic diglossia. But 'humor' is not necessarily restricted to an informal variety or a local dialect. Code-switching can be humorous in its creative use of two 'standard' languages. The following Chinese example 10 is a case in point (English italicized):

Zhangsan: Zuijin ni kangjian Xiao Wang[11] meiyou?
'Have you seen Little Wang recently?'
Lisi: Kangjian le. Shangzhou women hai yiqi qu yijia zhongguo caiguan chi le wanfan.
'Yes. Last week we went to have dinner together at a Chinese restaurant.'
Zhangsan: Ta zuijing zenmeyang?
'How has he been recently?'
Lisi: Hai keyi le. Zhishi ta aishui lanjiao.
'He's fine. But as usual he likes to stay in bed in the morning.'
Zhangsan: Ta jiren ruci *lazy*, hebi laimei *study*?
'Since he's so lazy, why did he come to study in the States?'
Lisi: Hai bushi gan chaoliu.
'He just follows the trend.'

Zhangsan:	You shihou wo xiang dao buru quge jiaojiao *lady*, shenge pangpang *baby*. 'I sometimes think [he] should marry a pretty lady and have a cute baby.'
Lisi:	Bi kai wanxiao le. 'Don't be kidding.'

First, the switching is between Putonghua and English, neither of which is considered 'local'. Secondly, unlike the Fiji-Hindi switching, where 'humor is provided simply by the switch from Fijian to Hindi' (Siegel 1995:97), the humorous effect in the Chinese example is achieved by the 'poetic' and 'creative' use of both Chinese and English. Note that all the four English words (*lazy*, *study*, *lady* and *baby*) have the same rhyme, each word having two syllables. They match very well with the two-syllable Chinese words (*ruzi* 'so', *laimei* 'come to the States', *jiaojiao* 'beautiful' and *pangpang* 'cute') that serve as their modifiers, which in turn match rhythmically with other two-syllable Chinese words (*jiran* 'since', *hebi* 'why', *quge* 'marry' and *shenge* 'give birth to'). All this combines to create a humorous effect. This appears to run counter to Siegel's argument (ibid. 101–02): 'it is not creative language play which is the source of humor but rather the "promiscuous" use of code-switching itself in situations where strict separation of language is the norm', since our Chinese data shows that it is not the 'promiscuous' use of code-switching itself which is the source of humor, but rather the creative language play in code choices between Chinese and English. The richer repertoire of code choices available to bilinguals enables them to switch competently from one code to the other in verbal communication, indicating 'a greater degree of competence' (Poplack 1980:259).

The 'rhythmic' and 'parallel' structure of our Chinese example also exhibits the 'aesthetic effect' (Myers-Scotton 1993:139), but it does not show the exact same features of what she calls 'structural flagging' (Myers-Scotton 1993:141–42). Myers-Scotton states that structural flagging occurs principally at two levels. First, the content of a marked choice is often a repetition of what has already been said in the unmarked medium of the exchange; secondly, marked choices are very typically phonologically flagged. Nothing in our Chinese example is repeated nor are marked choices (English) phonologically flagged. Phonological flagging, if it did exist in our Chinese example, should involve at least both unmarked choices (Chinese) and marked choices (English), since the humorous effect is not achieved by the marked choice alone.

Despite the fact that speakers cannot entirely ignore addressees in making choices, code choices as an expression of 'humor' seem to be more speaker-oriented than audience-designed, since they 'better represent the imprint which speakers wish to make for themselves on a conversational exchange than anything else' (Myers-Scotton 1993:141). In other words, speakers appear to focus more on their own position in expressing the meaning(s) of code choices than on their 'response to their audience' (Bell 1984:145). Code choices as a speaker-oriented expression of 'humor' find further evidence in the use of Spanish loan material in English. Citing 'Grassy-ass' in a thank-you greeting card in which it shows Hawaiian dancers dressed in grass skirts, Hill states that although Spanish speakers might find them irritating and offensive, such code choices directly index what she calls 'a speaker's sense of humor' (1995:206). Its humorous effect lies in 'a language game' (Wittgenstein 1958) the speaker plays between the sound of the Spanish expression *gracias* ('thank you') and that of the English expression 'Grassy-ass'. Thus, 'the speaker's meaning is primary' (Clark 1992:xv) in these cases of code-switching.

4. CODE-SWITCHING DUE TO LANGUAGE ATTRITION. Language attrition is defined as a form of individual language evolution by which an individual loses (part of) his/her competence or proficiency in a particular language (Andersen 1982:84). There are four types of language attrition (Van Els 1988:4):

1. Loss of L1 in an L1-environment, e.g., dialect loss within the dialect community;
2. loss of L1 in an L2-environment, e.g., loss of native language by migrant workers;
3. loss of L2 in an L1-environment, e.g., foreign language loss; and
4. loss of L2 in an L2-environment, e.g., second language loss by aging migrants.

Relevant to code-switching are type two and type three of language attrition. I will, however, focus my discussion on type two of language attrition, since my current data appears to be most illustrative of this type of language attrition. One of the reasons bilingual speakers switch codes is that they have lost lexical items in their L1 because of cultural change. A case in point is Chinese residents in the United States switching to English when they talk about, for instance, doing grocery shopping:[12]

Lady A: Zhen shang naojin. Sucai you zhangjia le.
'It's really troublesome. Vegetables' price is rising again'.
Lady B: Yidian bucuo. *Spinach, lettuce, tomato, green beans* duo bi yiqian gui le haoduo.
'Yes, indeed. Spinach, lettuce, tomatoes and green beans are getting much more expensive than before.'

Lady A: Shenme shi *lettuce.* Wo ke conglai mei maiguo.
'What is lettuce? I have never bought [it].'
Lady B: *Lettuce,* zhongwen jiao shenme laizao? jiu shi.. [a short pause][13]
'Lettuce, what's the Chinese for it? It is..'
Lady A: Shi bu shi 'da bai cai'?
'Is it Chinese cabbage?'
Lady B: Bu shi de. Meiguo ren chang yonglai zuo *salad* de.
'No. Americans often use [it] for salad.'
Lady A: Na shi bu shi 'shengcai'?
'Is it 'lettuce'?
Lady B: Dui le, shengcai. Ni kai, lai meoguo mei jinian ba zhongwen duo gai wang le.
'Yes, lettuce. You see I'm losing my Chinese although I've been in the States only for a few years.'

The dialogue above shows clearly that the speaker's switch to the English word *lettuce* is a result of her loss of the L1 (i.e., Chinese) word for it. This kind of switching is 'speaker-oriented' in the sense that speakers 'orient' towards L2 code choices because of L1 attrition. Obviously, such examples of code switching could not be adequately accounted for by Bell's argument of code choices as audience design.

5. CONCLUSION. I have presented, from the perspective of societal norms governing Mao's conversational style and the code choices of Chinese students at the University of Hong Kong (Gibbons 1987), cross-cultural evidence of language style and code choices as 'speaker orientation' to complement Bell's theory of language style and code choices as 'audience design'. In doing so, I suggest that we could enrich Biber and Finegan's four observations by offering an additional observation with respect to 'societal norms'; namely, certain linguistic features are culture-specific and speaker-oriented. Drawing from my Chinese data, I have shown that the source of 'humor' in code-switching could be derived from speakers' creative language play instead of the 'promiscuous' use of code-switching itself, contrary to Seigel (1995), and that the structure of marked choices is not necessarily 'flagging', contrary to Myers-Scotton (1993). I have also argued that Bell's theory fails to account for speaker-oriented code choices due to language attrition. In the light of these findings and taking into consideration the rich insights of Bell (1984) and of Finegan and Biber (1994), I propose that language style and code choices derive from considerations of the nature of audience, societal norms, functions, situations and status.

'The nature of audience' takes into account not only 'addressees', 'auditors', 'overhearers' and 'eavesdroppers' (Bell 1984), but the dynamic relationships

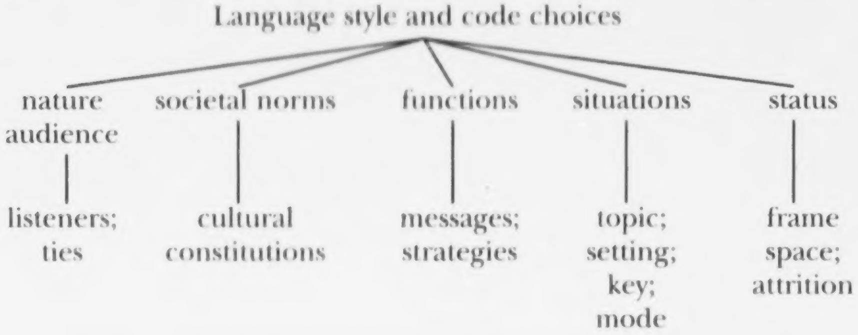

Figure 1. Factors affecting language style and code choice

among participants in speech situations, such as power relations (Ladegarrd 1995) and 'strong' or 'weak' ties (Milroy & Milroy 1985) that a speaker has with his or her (group of) listeners. Speech accommodation (Giles, et al. 1987) largely arises from consideration of 'the nature of audience', too. 'Societal norms' also govern language style, as in the case of Mao's conversational style, and code choices, as in the case of Chinese bilinguals' nonuse of English in conversations at the University of Hong Kong (Gibbons 1987). 'Functions' are manifestations of meanings such as 'prestige', (e.g., using *r* in New York City, Labov 1972), and 'humor' (e.g., the Chinese example discussed above). 'Functions' should be seen as 'dynamic factors' (Myers-Scotton 1993:57) or 'pragmatic factors' (Romaine 1995:161) ranging from 'attitude' (e.g., an in-group marker, Benttahila & Davies 1995:86), 'politeness' (Li 1995) to 'marking personalization vs. objectivization (e.g., talking *about* action vs talking *as* action) as a discourse strategy' (Gumperz 1982). 'Situations' entail topic, setting, 'key' (Hymes 1972b), and 'mode' (Halliday 1989), the last of which refers to Finegan and Biber's observation C. Topic, setting and key could be situations influencing language style (e.g., Youssef 1993:273; Rickford & McNair-Knox 1994:258) and code choices (e.g., Appel & Muysken 1987:118; Søndergaard 1991:91; Myers-Scotton 1993: 57) independent of what Finegan and Biber refer to as 'literate' or 'oral' situations, thus broadening the scope of observation C. 'Status' recognizes not only language variants among socially ranked monolingual groups, with socially higher-ranked groups showing more frequent use of the elaborated variants and lower-ranked groups showing more frequent use of the economy variants (i.e., Finegan and Biber's observation D), but also 'greater resources', 'more means' (Romaine 1995:173), or a wider 'frame space' (Goffman 1981:230) available to bilinguals than monolinguals, as in our example of 'creative' uses of 'humor'. 'Status' also accounts for code-switching due to language attrition for the obvious reason that the status of L1 attrition of leads to the code choice of 1.2. The following diagram is thus an illustration of these considerations that give rise to variations in language style and code choices

This alternative account is an answer to recent calls for more explicit theory building (e.g., Finegan & Biber 1989:3). It shows that code choices could be placed in the larger framework of register variation (e.g., Gardner-Chloros 1991:186; Halmari & Smith 1994:442). While Gardner-Chloros (1991:186) views code-switching as being 'strongly associated with an informal, chatty register', and Halmari and Smith (1994:435) focus their discussion of code-switching on prosodic and syntactic features, such as shifts in voice quality, interrogatives, lexical markers, deictic terms, tense changes, and imperatives within the framework of Auer's (1984) contexualization strategies, I have shown, perhaps from a macro-perspective, that code choices, just like style variation, are the result of considerations of the nature of audience, societal norms, functions, situations and status. I hope that this alternative account contributes to the whole gamut of studies on language variation, and that it offers a more comprehensive account of the rich varieties of language style and code choices.

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[1] Clark and Murphy (1983) also used the term 'audience design', which appears to have its roots in 'recipient design' (Garfinkel 1967).

[2] 'Listeners' could be said to be part of the audience.

[3] There is a slight inconsistency in Finegan and Biber's discussion of Bell's theory. On the one hand, they say Bell's theory accounts for observations A and B (p. 319). On the other, they argue that Bell's theory accounts for observation B only (p. 337).

[4] For topic-shifting as a motivation for style-shifting, see also Shuy (1975) and Kachru (1978).

[5] Persons, roles and power relations in speech interactions could be factors related to the audience design. Thus Ladegaard's argument seems to be inherently part of Bell's theory.

[6] Mao Zedong (1893–1976) was the Chinese Communist leader (1949–1976).

[7] Kuhn (1991:229) defines *deng* as 'the major division' and *ji* the minor.

[8] Mao's conversational style appears to be paralleled in accounts of adult caregivers' invariant speech patterns to young children in Kaluli and Western Somoan society (Ochs & Schieffelin 1984; Schieffelin 1990), Trackton (Heath 1983), K'iche' Mayan (Pye 1992) and Javanese communities (Smith-Hefner 1988).

[9] This example appears to contradict 'the markedness model', which 'sees speakers as making choices, not because norms direct them to do so, but rather because they consider the consequences' (Myers-Scotton 1993:153). It is the norms rather than the consequences that direct the Chinese students at the University of Hong Kong not to switch to English, for 'consequences' will not result if there exist no such social norms.

[10] This example is taken from the data I gathered in 1994 when I was invited to attend a Spring Festival party at one of my friends' house. I observed and recorded some of my friends' conversations.

[11] To maintain the anonymity of the interlocutors and the person involved in the conversation, I use Zhangsan and Lisi for the interlocutors and name the third person Xiao Wang.

[12] This example is taken from the same data corpus I gathered in 1994. See note 11.

[13] The transcription here ('two dots ..' for 'a short pause') follows Du Bois, Schuetze-Coburn, Cumming, and Paoline (1993).

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VII. LEXICAL & SEMANTIC STUDIES

IDIOMATIC PROPERTIES OF EIGHTEENTH-CENTURY ENGLISH

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1. Introduction. Eighteenth-century English is very important in the history of English in view of the development of prose and the coexistence of grammatical variants which present-day English no longer has. But little research has been done in the domain of idiomaticity in particular. Considering its importance as the formative period prior to present-day English, more attention should be paid to the late Modern English period.

On the basis of ample data of eighteenth-century English which I have collected, I shall discuss some idiomatic phenomena and phrasal verbs. Earlier and later examples are cited as the occasion arises.

2. Some mechanisms of idiomization. In late Modern English some forms existed which had their fluctuating or rivalry forms and eventually established themselves as idioms in present-day English. I shall consider a 'drift' in which idiomatization takes place by taking some of these phrases as examples.

One remarkable tendency in the process of idiomatization is observed in the change from concreteness to abstractness in nouns, i.e., decategorialization of nouns. This tendency can be attested in the disappearance of the definite/indefinite articles, or of the plural forms of nouns.

The noun *advantage* in the phrase *take advantage of* was a full noun. The following examples demonstrate this fact.

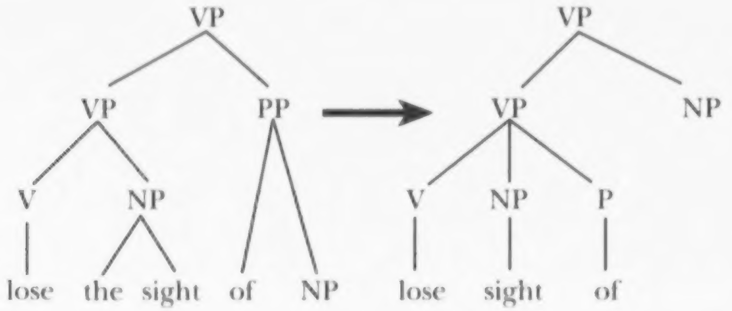
(1) But I will not on this occasion, take the advantage of the great number... (Dryden:65)
(2) ...but as if the Bonds were foreited, indeavor to take their Advantage... (Butler:206)
(3) 'Tis true, gentleman, I must take an advantage of you... (Farqhar:185)

The same thing can be said of the phrase *lose sight of*. The noun *sight* showed every indication of a noun, as the following examples show:

(4) ...so that they that were behind lost the sight of him that went before. (Bunyan:150)

(5) They loste ye syght of ye castell, it was clene vanysshed a way. (OED a 1533 LD Berners Huon xxiii 68)

Reanalysis[1] plays an important role in language change. At first, this has only a localized effect, but then it gradually exercises its influence on the whole. This change occurs on all levels—lexical, syntactic and semnatic. Clearcut distinctions of this kind are difficult to make, and these changes are correlated with each other. The process of reanalysis in the case of *lose sight of* is as follows:[2]



Sight before reanalysis is concrete in the sense that the noun can take *the* and the possible modification as grammatical features. After reanalysis the definite article *the* disappeared in the noun, and the content of the noun is not necessarily an object that can be seen, as in

(6) The higher the view which men take of life, the more they lose sight of their own pleasure or interest. (OED *sight* II 4c 1875)

The passive is also possible, as in

(7) The conjecture was not lost sight of by contemporary or succeeding botanists. (OED *sight* II 4c 1837)

At this juncture I should like to point out another tendency to move from static to dynamic which has been taking place throughout the periods. Some important grammatical changes took place particularly in early Modern English, such as the emergency of *get* as a passive auxiliary, the establishment of a modal category, and the increase in the so-called expanded form.[3] In this dynamic, the development of V NP idioms is only a natural phenomenon. The fewer the nouns are, the more dynamic the expression is.

Idioms containing nouns, such as *foot* and *face*, express literal meanings, showing their plural forms and the attachment of *one's*, as the following examples show:

(8) Lady Sm. Mr. Neveront, your Handkerchief's fallen, Miss. Let him set his Foot ypon it, that it mayn's fly in the Face. (Swift:66)
(9) ...I would cry out to all those who have but set a foot in the perilous flood. (Lamb:159)
(10) ...set your faces like a flint, you have all power in heaven and earth on your side. (Bunyan:123)

As a noun loses its plurality form and the definite/indefinite articles, it becomes idiomatic.

Other idiomatic phrases which undergo the change from concreteness to abstractness are as follows:

(11) ...the only use that can be made of such a Monarch, is... (Dryden:217)
(12) ...all the powers that goats, asses, and bulls, can give me, by engaging for my not making an ill use of them. (Lord:330)
(13) Such regulations would in general be no material impediment to obtaining the article, but a very considerable one to making an improper use of it without detection. (Mill:108)
(14) ...when no defect can have taken so deep a root as to be immoveable... (Lord:276)
(15) When the snow lies so deep and hard, that they cannot penetrate to the roots of the grass, they make a diurnal progress... (Smollett:253)
(16) They keep their distances as if they were Mountagues and Capulets... (Dryden:35)
(17) ...and never puts his Subjects to the Trouble of giving their voyces at the Elections of their Officers... (Butler:181)

In present-day English, the phrases *make use of*, *take root* and *make progress* do not take the article. In the phrase *keep one's distance*, the noun keeps the singular form, and *give one's voice* leads to *give voice to* after the noun becomes uncountable in the phrase.

In 'preposition+NP+preposition' phrases, the definite article *the* was often attached to the nouns in early English and eighteenth-century English. This seems to indicate that the phrases were used more literally than now.[1] Kruisinga (1932:1363) says, 'In all these cases the construction with the article (in the absence of, etc.) is also possible and perhaps equally correct. The

	18TH CENTURY				19TH CENTURY			
	ESSAY	LETTER	FICTION	DRAMA	ESSAY	LETTER	FICTION	DRAMA
forth	0	2(2)*	9(6)	2(2)	6(4)	1(1)	13(10)	1(1)
back	6(5)	5(3)	15(15)	1(1)	2(2)	14(9)	7(7)	35(10)
away	2(2)	7(7)	16(12)	18(12)	5(4)	21(15)	30(16)	51(17)
off	0	31(13)	13(11)	39(19)	5(4)	41(25)	8(6)	23(15)
down	9(6)	34(17)	18(14)	27(13)	25(9)	32(18)	19(13)	51(26)
out	14(12)	35(23)	26(20)	23(19)	33(15)	53(20)	10(8)	75(24)
up	35(8)	68(42)	39(25)	47(31)	30(17)	76(42)	40(26)	109(55)

Table 1. Frequency of verbal particles in English literary genres of the 18th and 18th centuries in order of frequency. The figures in parentheses show type frequency.

reason is that each element of the group has retained its independent meaning in the minds of many speakers'.

(18) …which we have not only since that time entertained, but also in like manner augumented, by the meanes of the good report of honorable personages… (Deloney:280)

(19) …if a Planet can go East and West at the same time; one way by virtue of his own motion, the other by the force of the first mover… (Dryden:47)

(20) He charged up Cheapside in the front of the buff-coats with such bravery and courage… (Farquhar:115)

(21) It shall not be for the want of my utmost endeavours, if our intimacy does not continue for life. (Smollett:91)

(22) …to supplant each other in the favour of the squire, as any two courtiers can do to supplant each other in the favour of their prince. (Lord:80)

(23) Consider the importance of these things as they deserve, and you will not lose one minute in the pursuit of them. (Lord:164)

3. PHRASAL VERBS. In line with Hiltunen (1994), I shall examine the following particles in collocation with verbs in eighteenth- and nineteenth-century English: *away*, *back*, *down*, *off*, *out* and *up*.

Hiltunen	18th	19th	present-day
back	*forth*	*forth*	*forth*
off	*back*	*back*	*back*
forth	*away*	*off*	*away*
down	*off*	*away*	*down*
away	*down*	*down*	*off*
out	*out*	*out*	*out*
up	*up*	*up*	*up*

Table 2. A comparison of the frequency of occurence of English verbal particles from the early modern period (according to Hiltunen 1994) to the present. These are presented in order of ascending frequency.

To obtain a comprehensive picture of phrasal verbs in those periods, examples are collected from various genres of writing. That is, essays, letters, fiction and dramas, and each length is approximately 60,000 words. The total of examples collected is 1347 (531 from eighteenth-century English, and 816 from nineteenth-century English.

Table 1 shows the frequencies of the particles in each genre of each century in the order of frequency.

Table 2 shows a comparison of change in frequency of particles from least to most frequent between Hiltunen's and mine. The frequency of present-day English particles (taken from *Cobuild Dictionary of Phrasal Verbs* [1989]) is shown for reference.

The following points are worth emphasising: (1) *Up* and *out* have been most frequent up to the present. (2) *Forth* has come to be infrequent. (3) *Away* has come to be less frequent, as time has gone. (4) *Off*, which was not so frequent in early Modern English, has become very frequent in present-day English.

In the light of genre, phrasal verbs occur more frequently in letters and dramas than in essays or academic writing in particular. This tendency gives the impression that phrasal verbs are colloquial. Phrasal verbs begin to increase in the nineteenth century, particularly in the genre of drama.

Semantically, *back*, *down* and *forth*, and to a less extent, *away* and *off* express their literal meanings of movement or transition, while *up* and *down* often express idiomatic and abstract meanings, although this statement depends partly on individual collocations.

The verb-particle combinations which occur frequently in eighteenth- and nineteenth-century English are given in figure 3.

18TH CENTURY	19TH CENTURY	18TH CENTURY	19TH CENTURY
take away (8)*	run away (14)	go off (9)	go off (9)
send away (3)	go away (14)	cut off (8)	set off (6)
throw away (3)	die away (7)		
die away (2)	pass away (6)	set off (7)	take off (6)
give away (2)	take away (5)	bring off (5)	leave off (5)
		carry off (5)	put off (4)
come back (4)	come back (21)		
send back (3)	go back (5)	set out (11)	find out (26)
sit down (7)	sit down (18)	find out (9)	go out (22)
come down (5)	go down (15)	cry out (4)	turn out (16)
throw down (4)	come down (13)	lay out (4)	point out (13)
go down (13)	put down (12)	come out (3)	get out (4)
come forth (2)	call forth (6)	make out (15)	give up (26)
go forth (2)		give up (12)	keep up (14)
pour forth (2)		bring up (12)	get up (13)
lend forth (2)		take up (12)	take up (11)
		keep up (9)	make up (9)

Table 3. Frequently occuring verb-particle combinations in eighteenth- and nineteenth-century English. The figures in parentheses show frequency.

4. SUMMARY. The late Modern English period has been comparatively ignored in the history of English, mainly because the period forms part of Modern English, giving the impression that there has been no major linguistic change since that period. Certainly, unlike Old English and Middle English, there may be no remarkable change to be noticed in this period in terms of syntactic and grammatical structures, but at the same time, we will recognise some differences compared with English before and after the late Modern English period, at least in the light of statistical trends. I have tried to describe some idiomatic expressions and phrasal verbs in late Modern English.

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[1] This term has been used variously, roughly corresponding to 'reinterpretation' and 'restructuring'. Denison (1993, passim), under the name of reanalysis, discusses such problems as a change from impersonal to personal, the passivization of indirect object as subject, the auxiliarization of *do*, and the development of the perfect and progressive.

[2] I do not claim to explain all the 'V+N+P' types of idioms with this analysis. Because of the scarcity of data, not all attested the examples can be detected. In some idioms, such as *take heed*

of and *take notice of*, *of* can be considered to have been introduced later just to govern the following nouns.

[3] The get passive appears in 1625 (OED). As regards the modal category, see Lightfoot (1978:101). With regard to the expanded form, Trnka (1978:37) says '...it is in the latter half of the sixteenth century that it is used extensively in English'. Visser (1973: 1834–1835) refers to the two types of expanded form such as *you are being naughty* and *you are being a bore* as Modern English products.

[4] Schwenter and Traugott (1995) discuss such complex prepositions as *instead of*, *in place of* and *in lieu of*, referring to the nonreferential and decategoralized properties of the nouns.

[5] Konish (1958:122) says that it was in early Modern English that phrasal verbs came to possess idiomatic or figurative meanings.

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Butler, Samuel. *Prose Observations.*
Deloney, Thomas. *The Works of Thomas Deloney.*
Dryden, John. *The Works of John Dryden.*
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HOW 'LOCATIVE' IS THE LOCATIVE CASE? ON THE MEANING OF THE POLISH PREPOSITIONAL PHRASES WITH THE LOCATIVE

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LOCATIVE*, the sixth case in the Polish declensional paradigm, is the only one of the seven Polish cases that is always used in combination with a preposition.

In Old Church Slavonic, the locative did still employ the archaic prepositionless form (see examples in Bartula 1981:118), but even then the prepositional uses were much more common. In medieval Polish, much like in modern Lithuanian, the bare locative was rare and likely felt to be archaic, for there are but few attested examples in the literature, mainly such common temporal locatives as *zimie*-LOC 'in winter', *jutrze*-LOC 'tomorrow', etc. (for discussion and examples see Kempf 1978:109–10). Since the prepositionless form of the locative in Slavic began to be substituted by the preposition + locative combination comparatively early, the locating relationship indicated by the locative case alone must have been felt to be too general and obviously not sufficiently determined. Yet, the locative case has not been abandoned, and even though in modern Slavic it has to co-occur with a preposition, it still does have a distinct case ending (in Polish the locative is marked by the final *-e* or *-u* , depending on the final consonant of the noun's base in the singular, and the characteristic *-ach* ending for all plural forms), a fact which suggests that: (a) the locative case carries a meaning of its own, and (b) the semantic element reflected in the locative affix does play a valid role in the case's overall meaning.

The fact that there are no examples of bare locative usage in modern languages creates a certain methodological difficulty for case semanticists working in cognitive linguistics, for there is no obvious candidate (i.e., no ideal prepositionless example) that could be posited as the locative case's prototypical centre (Janda 1993:205, note 30). The bare case is given unquestioned priority over the prepositional case in the semantic network models proposed by Janda (1993) and Rudzka-Ostyn (1993) for the Czech dative, the Russian instrumental and the Polish dative, respectively, where the preposi-

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tional cases are treated as the peripheral (and thus clearly less important) extensions of the central prepositionless uses.[1]

In the cognitivist publications, cases and prepositions are treated as two distinct categories: case is considered a *morphological* category *par excellence* (see, e.g., Taylor 1989:142ff.), and thus part of what is known as grammatical semantics, and preposition is always viewed as a purely *lexical* category (see Taylor's summary of the cognitivists' analyses of the meanings of *over*—1989: 127–30; also Sandra & Rice 1995), whose study belongs to the field of lexical semantics.

It should also be noted that the major cognitivist studies in prepositional meaning (Brugman 1981/1989, Lakoff & Brugman 1986, Taylor 1989, Schulze 1993, Sandra & Rice 1995) are limited to languages without case, where prepositions (considered in their basic spatial uses) are the only overt signs of the spatial relationship between the entity that is located in space (the trajector—TR) and the entity that is the locater and that serves as the reference point (the landmark—LM) in the act of locating. Consequently, the many aspects of the spatial relationship that have been examined in these studies, such as place, goal, path and source of the TR as well as the shape, size, dimensionality of the LM and the TR; the presence or absence of contact between the TR and the LM; the distance between the TR and the LM, etc. (see Taylor 1989:110) are treated as the dominant characteristics determining the different semantic types distinguished in the semantic networks of individual prepositions.

But, in case languages, prepositions cannot exist independently, i.e., in isolation from case, and even if it is hard to establish the exact semantic contribution of preposition and of case in the preposition + case combination, the two categories have to be considered jointly in a semantic analysis of prepositional cases. It goes without saying that in a semantic analysis of the modern locative, the semantic import of the locative affix and that of the locative prepositions have to be given equal consideration.

Since the modern locative always co-occurs with a preposition, the meaning signalled by this case's affix must be compatible with the lexical meaning of the preposition in the preposition + locative combination. This necessary semantic compatibility explains why the Polish locative does not co-occur with just any or all prepositions, but with a strictly limited few, namely: *w* 'in', *na* 'on, at', *o* 'about, with', *po* 'all over, on, after' and *przy* 'near, next to, by...', as illustrated by examples in (1):

(1) a. Książka jest *w torbie*-LOC INESSIVUS
The book is *in the bag*-LOC

b. Książka jest *na biurku*-LOC SUPERFICIALIS
The book is *on the desk*-LOC

c. Myślę *o tej książce*-LOC PERTINENTIALIS
I am thinking *about this book*-LOC

d. Pajak chodzi *po książce*-LOC PROLATIVUS
A spider is walking *on (all over) the book*-LOC

e. Jan siedzi *przy łóżku chorego ojca*-LOC ADESSIVUS
John is sitting *by the bedside*-LOC of his sick father.

The five Latin terms on the righthand side of the examples in (1) are borrowed from Kempf (1978), a Polish linguist who in his 1978 book sketched out a meaning-based classification of cases in the world's languages. They refer to the basic types of spatial relationships distinguished by this author on the basis of the essential semantic characteristics of the five spatial prepositions the Polish locative combines with: INESSIVUS denotes the relationship of containment within, represented by the most characteristic locative preposition *w*, as in *Książka jest* w *torbie*-LOC 'The book is in the bag-LOC'; SUPERFICIALIS, in its basic spatial sense, refers to the relationship of positioning on a surface, epitomized in Polish by the preposition *na*, as in *Książka jest* na *biurku*-LOC 'The book is *on* the desk-LOC'; PERTINENTIALIS signals an abstract relationship (which, however, can be traced to its spatial origins—see below) of pertaining or referring to (Kempf 1978:103, 123), a relationship exemplified in Polish by the preposition *o*, as in *Myślę o tej książce*-LOC 'I am thinking about this book-LOC'; PROLATIVUS is represented by the preposition *po*, which in its basic, spatial sense expresses the notion of covering a space or an area in an irregular, haphazard manner, as in *Pająk chodzi* po *książce*-LOC 'The/a spider is walking *on* (all over) the book-LOC'. (The notion expressed by *po* is rendered in English by the group of *all over* examples represented by the sentences: *He walks all over the city*; *The child threw his toys all over the floor*—see Taylor 1989: 11–112.) The last relationship, ADESSIVUS (from the Latin *ad* 'to' and *esse* 'be'), expressed by the preposition *przy*, which is perhaps the most general of the Polish locative prepositions, indicates the entity's presence in the physical proximity, or in the sphere or zone of influence of the locater, denoted by the locative-marked NP, as in *Jan siedzi* przy *łóżku*-LOC *chorego ojca* 'Jan is sitting *by* the bed-side–LOC of his sick father'; *Jan jest przy rodzicach*-LOC 'Jan lives with his parents-LOC' (i.e., he is still living with them and he depends on them financially). The preposition *przy* is exclusive to the locative. Unlike the other four prepositions, all of which combine with at least one other case, *przy* does not 'govern', i.e., is not compatible with, any other case but the locative. This fact suggests that, even though it is apparently not the oldest locative preposition in Polish (the oldest attested prepositional uses of the locative involving the prepositions *w* and *na*—Kempf 1978:110), it is perhaps the one which is the closest to the locative case's basic meaning.

It is only natural that the five locative categories exemplified in (1), distinguished on the basis of the semantic characteristics of the five Polish locative prepositions, do not correspond exactly to the semantic types suggested for the prepositions *over* (Brugman 1981/1989), *in*, *on* and *at* (Sandra & Rice 1995) in the cognitivist studies of spatial prepositions in English, for (apart from all other considerations) a semantic analysis of prepositional phrases in case languages has to be different from an analysis of prepositional expressions in any caseless language, where the meaning of individual prepositions is not limited by the obligatory copresence of a specific case.

In this paper I will discuss the most essential semantic characteristics of the Polish locative. Since the locative combines with five different prepositions, all but one of which are also employed by at least one other case, the task is double: (a) first, an element of meaning that is common to all of these prepositions and that is also compatible with (i.e., is present in) the basic, overall meaning of this case, has to be isolated; (b) second, the locative uses of these prepositions have to be compared with their non-locative uses so that the points of similarity and the points of contrast between the locative relationship and the relationships expressed by the other cases can be brought to light. Respecting the scope limits of this presentation, I will focus on the first objective only, namely, the identification of the common element contained in the locative phrases in Polish.

The name of the locative case (*Locative* or *locativus*, from the Latin *locus* 'place', rendered in Polish by *miejscownik*, 'that which locates or places', a derivative from the noun *miejsce* 'place'), indicates that the basic semantic function of this case is to locate things (or entities) with respect to other things, or to signify location (i.e., being) of things in some place.

According to Aristotle, who more than two thousand years ago devoted a whole book in *Physics* to philosophical reflections on the nature of being and of place (Aristotle, *Physics*, bk. IV, chs. 1–5) things cannot exist without being somewhere, i.e., in some place, so place (along with time and void) is one of the necessary conditions of being.[2] The fact that the notions of being and place are linked found a linguistic reflection in classical Greek and Latin which both had compounds of the verb *to be* with a prefix equivalent to the English *in*, thus manifesting in language Aristotle's ontological statement that 'being' means 'being in'. In some uses, illustrated by examples (2)a and (2)b, the Polish verb *być* 'to be' also expresses the notion of being in a place, i.e., of 'being in'. The form *jest* in the question of example (2a) translates into English by *is* with the adverbial of place particle *in*:[3]

(2) a. Czy dyrektor *jest*?
Is the manager *in*?

In a classroom situation, illustrated by example (2)b, when the teacher reads out the names of the students to check presence, the standard short answer in Polish is *jest*, meaning 'present in class'. In the equivalent situation, English uses the adverbial pronoun of place *here*; the finite form of *be*, unaccompanied by an adverbial of place (*he is*), is impossible.

b. Kowalski? *Jest!*
Kowalski? *Here!*

In the argument leading up to the final definition of place (in *Physics*, book IV, chp. 4) Aristotle argues that our concept of place has been motivated by the phenomenon of motion ('First we must understand that place would not have been thought of, if there had not been a special kind of motion, namely that with respect to place'—Hutchins 1952:290). A reference to motion is also present in Aristotle's definition of place, which to him is 'neither the form, nor the matter, nor the extension of the thing that is displaced', but 'the boundary of the containing body at which it is in contact with the contained body'—by the contained body is meant what can be moved by way of locomotion—or 'the innermost motionless boundary of what contains' (Hutchins 1952:291). Thus, in terms of Aristotle's definition of place, the essential characteristics of the locative-case denoted locater in the relationship between a place and a thing evoked in relation to this place would be: (a) its static nature, and (b) its innermost boundary, i.e., the area of contact with the contained body.

In his classical article on the meaning of the Russian cases, Jakobson (1936/1984:72, 90) suggests that the essence of the relationship expressed by the locative lies in the *limiting* ability of the locater, i.e., in its power to limit the extension of the located entity, which is 'the dominant [i.e., profiled, BB.] category', in the locater/located relationship: while 'the entity which is in the locative is not represented in the utterance to its full extent', the locative 'defines the extension and in fact the full extension of the object which is the dominant category' (Jakobson 1936/1984:90). In Jakobson's words, the entity evoked by the locative-marked NP provides 'the complete objectivization of the entity signified by the dominant category' (ibid.). Thus, in his search for the core meaning of the locative case, Jakobson did not concentrate not on the characteristics of the LM (i.e., the locater or place), but on the effect of the locater (of the LM) on the TR, i.e., the entity profiled in the locative locater/locating relationship, specifically on its extension and limits.

An examination of the expressive effects produced by a sample of locative examples from Polish gathered in (1) will reveal if the limiting effect of the locative marked locater on the located entities can be detected in the preposition + locative combinations representing the five prepositional subgroups of the locative relationship.

Within the relationship of inessivus, illustrated by (1)a and represented by the preposition *w* 'in', the bag, evoked by the locative-marked substantive, is viewed as a three-dimensional container, the profiled book is located within. So, the physical extension and limits of the book are fully determined by the spatial limits of its container. In the more abstract, metaphorical uses of the locative with *w*, such as that illustrated by (3)a, the line referred to by the locative-marked substantive constitutes the locating LM. It has no clear limits itself, but it determines the profiled event (the TR) of the soldiers' standing by highlighting the way in which it was carried out. In the speaker's mind, the manner in which the soldiers stood is the most important characteristic of the event, a descriptive element essential for creating its mental image and therefore its most important dimension. Since it determines the picture of the activity in the speaker's mind, it can be interpreted as an element defining, or delimiting, the extension of the event in his or her mental space.

(3) a. Żołnierze stali *w szeregu*-LOC
The soldiers stood *in line*-LOC

The LM entity evoked by locative with the preposition *na* in example (1)a, which illustrates the relationship of superficialis, points to the desk as the place where the TR, i.e., the book, is located. The book is evoked in its physical entirety while only the [two-dimensional] surface of the desk's top is involved in the image.

Examples in (3)a' illustrate one of the systematic principles that underlie the difference between the locative with the preposition *w* and the locative with the preposition *na* in Polish. The locative-marked locater in the PP's with the preposition *w* is easily imaginable as a three-dimensional container, while the locater in the PP's with the preposition *na* evokes a picture of space with no clear-cut boundaries. In the a-examples with *w*, the located objects can be imagined as fully enclosed in their containers, which are seen as clearly three-dimensional, while in the b-examples, with the preposition *na*, they are visualized as spread out (i.e., placed) in the open, with no perceivable notion of depth and no limits. One could argue that this is the way we imagine surface:

(3) a'.

w + locative:	*na* + locative:
we wsi 'in the village'	*na wsi* 'in the country'
w niebie 'in heaven'	*na niebie* 'in the sky'
w powietrzu 'in the air'	*na powietrzu* 'outdoors'
w morzu 'in the sea, in water'	*na morzu* 'out in the sea' (about boats)

Historically and also today (see Kempf 1978:110) the preposition *na* has often been used as a substitute for the preposition *w* in the relationship of containment to add to the meaning of the locater an idea of superiority or excellence, as in the examples of (3)b. The unwelcome, yet frequent substitution of *na* for *w* in modern colloquial Polish is also attributed to the influence of the dialectal forms, such as *na kosciele*-LOC 'on (in) church-LOC', *na piwnicy*-LOC 'on (in) the basement', etc., on the standard version of the language and, in the jargon uses, such as *na zarzadzie* 'on the council', *na komitecie* 'on the committee', to the general tendency towards simplification and shortening of the full forms *na zebraniu zarzadu* 'at the council's meeting', *na zebraniu komitetu* 'at the committee's meeting' (see Baba & Walczak 1992:174) .

(3) b. Jan pracuje *na uniwersytecie*-LOC
Jan works *at the university*-LOC

Spotkamy się *na fabryce*-LOC
We'll meet *on (=in) the factory*-LOC

The limiting potential of the *o* locatives in examples of pertinentialis, such as that in (1)c can be explained historically. Today, the locative with the preposition *o* is used only with the verbs of saying and cognition, and the located-locating relationship here requires a metaphorical interpretation. The mental activity (thinking, speaking, dreaming about, etc.), which is the profiled TR in examples such as (1)c, encloses the topics (objects) of our thoughts which are focused on and thus contained within the limits of the locater, such as the book in (1)c. Our thoughts can be imagined as wholly localized in their subject; they exist because of their subject; if there was no subject or topic to think about, we would not think. The early historical meaning of the *o* + locative prepositional expressions, provides welcome support for this determinist interpretation of the locatives in the relationship of pertinentialis. The preposition *o* in medieval Polish used to mean 'enclose in' and the metaphorical use of the *o* + locative construction with the verbs of saying and cognition has its origin in this old construction (Kempf 1978:112). A medieval Polish example representing the original use, is quoted in (3)c, after

Kempf (ibid.). The preposition *o* in this example is close in meaning to the adverb: *około* 'around' and signifies complete enclosure or inclusion. In (3)c, the man thrown into the abyss was literally physically sealed up in it:

(3) c. 'Wrzucił go do przepaści, a zamknął i zapieczętował *o nim*-LOC'
'He threw him into the abyss, and closed and sealed *him in*-LOC'
(Leopolita, quoted in Kempf
1978:112)

In the relationship of prolativus, with the preposition *po* used in its spatial sense of all over, about, as illustrated by example (1)d, the profiled TR denotes a movement along the path which is so convoluted that it virtually covers the area evoked by the locating LM. The path traced by the spider on the pages or the cover of the book in example (1)d, however long it may be, is fully contained within the spatial limits of the book. The spider's moves are limited to the area specified by the locater, and the boundaries determining the space covered by the spider are the physical boundaries of the locater. When the preposition *po* is used in its temporal sense of *after*, as in example (3)d, the TR's path is traced in time, which by nature orders events along the straight line from the position 'before' to the position 'after'. The entity located in time, such as Jan's coming in (3)d is delimited by the locater's temporal limits: Jan will come when the dinner is over. While the spatial locatives with *po* used as sentence adverbials are limited to co-occurring with predicate verbs denoting or implying movement, the temporal *po* locatives do not have any such restrictions. The temporal locative in example (3)b contains the verb of movement *przyjść* 'to come', but a 'static' (i.e., nonmovement) verb could easily be employed in the same context, as in *Jan śpi po obiedzie*-LOC 'Jan sleeps after dinner-LOC'.

(3) d. Jan przyjdzie *po obiedzie*-LOC
Jan will come *after dinner*-LOC

The last of the five preposition-based categories in the Polish locative, the relationship of adessivus, illustrated by example (1)e, is characterized by the preposition *przy*, the only one of the Polish locative prepositions that combines with no other case but the locative. The extension and the limits of the profiled located entities in the examples of (1)d are determined, both physically (when the locater denotes its proximity in space) and metaphorically (when it indicates its zone of influence) by the locative-marked entity functioning as the locater: Jan's sitting is limited to the area that can be described as 'near' or 'belonging to' his father's bed, but Jan's staying *przy rodzicach* 'with his parents' in *Jan jest przy rodzicach* 'Jan lives with (depends on) his parents' implies very clearly that he is seen as positioned in their zone of influence.

The fact that the preposition *przy* is exclusive to the locative suggests that it is fully compatible with the meaning conveyed by the locative affix and that the meaning of this preposition, or some essential element of its meaning, is very close to the locative case's basic characteristic. At this point in my research on the locative case the only tangible element distinguishing the *przy* spatial locatives from other locative PP's is the relative generality and indeterminacy of the relationship expressed by this preposition. According to some Polish stylists, the observed overuse of *przy* in modern Polish results in vagueness and inaccuracy of expression. A Polish William Safire, the popular Jan Miodek, has often expressed his dissatisfaction with the indeterminate character of the *przy*-locative constructions which tend to be used to express causality instead of the more accurate *in* + locative or *because of* + genitive phrases. One of Miodek's (1983) examples and its more accurate, 'correct' version are given in (3)e:

(3) e. Woda wrze *przy temperaturze*-LOC 100° C.
Water boils *at/with the temperature*-LOC of 100° C.

Better: Woda wrze *w temperaturze*-LOC 100° C.
Water boils *in the temperature*-LOC of 100° C.

CONCLUSION: The above locative examples representing five different prepositional uses of this case in Polish confirm Jakobson's observation that the locative-marked entity, the locater, always determines the extension and limits of the entity profiled in the locative relationship. Thus, it appears that this limiting ability of the locater is a defendable candidate for the common semantic feature of the locative case. It goes without saying that the examination of the Polish preposition-based locative types carried out here in the light of this generalization does not provide an exhaustive treatment of the Polish locative. A semantic study of the locative needs to be supplemented by a contrastive analysis of the prepositional uses in the locative with the uses of the same prepositions in the other cases. It is possible that after a comparison with the other prepositional cases some other general aspect(s) underlying the locative relationship can be brought to light.

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[1] In her 1993 book on case semantics Janda explains this position/choice by emphasizing the impossibility of determining exactly the semantic contribution of case and of preposition in prepositional phrases: 'the line which we commonly assume to divide prepositional from prepositionless case is indistinct and crossable; prepositional case interacts with the semantic

network although its role is perhaps more elusive. An analysis of the use of prepositions will not yield anything about the "general" or "basic" meaning of cases. Thus, in cognitive terms, prepositional case belongs in the semantic network of a given case, but its place is usually peripheral' (Janda 1993:23).

[2] I owe this observation to John R. Gallup (personal communication).

[3] Cf. the following quotation: '...everything is somewhere and in place. [Therefore] the potency of place must be a marvellous thing, and take precedence of all other things. For that without which nothing else can exist, while it can exist without the others, must needs be first; for place does not pass out of existence when the things in it are annihilated' (Aristotle, *Physics*, book IV, chp.1. In Hutchins, R. M. ed. *The Works of Aristotle* 1952:287).

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ON THE PRODUCTIVITY OF THE *RE-* PREFIX IN ENGLISH

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1. INTRODUCTION*. Some rules of word-formation seem to operate according to a variable rule so that a number of potential forms do not occur (Marchand 1969; Bauer 1983). As a case in point, Quirk et al. (1985:1544) consider the English prefix *re-* 'back, again' a productive prefix useful in the expression of 'time and order' when attached to verbs and deverbal nouns. This derivational process, however, appears to be somewhat limited to a particular subgroup as one can easily come across the verb *re-enter*, but not the verb ??*re-come*.

The purpose of this paper, then, is to explore some of the restrictions which impinge on the morphological process of *re-* prefixation. I shall first investigate the origin and meaning of the prefix, paying special attention to its aspectual sense and that of the verbs to which it is generally attached. I suggest that the prefix *re-* may serve to mark aspectual completion. Restrictions on the use of the *re-* prefix may, therefore, be explicable by the semantics of the prefix itself which, because it is inclusive of a perfective aspectual sense, plays a leading role in its own productivity process.

2. THE *RE-* PREFIX. The English prefix *re-* 'back, again' is of Latin origin where it occurred extensively as a productive adverbial prefix. When attached to a verbal form, the Latin prefix *re-* had the meaning of (a) 'back' (literally, 'back from a point reached'), e.g., *re-cedere* 'to fall back'; or (b) 'back' (literally, 'back toward the starting point of the action') e.g., *re-currere* 'to run back'. From these senses the meaning of the prefix shifted to that of 'again', denoting that the action was performed a second time. Yet, because repeating an action may also result in reversing it, the Latin *re-* prefix expanded its semantic range and, in some instances, featured the meaning of 'undoing', e.g., *cludere* (<**clodo*) 'close': *re-cludere* 'to disclose'. As a verbal prefix, it was borrowed early into English so that by the end of the sixteenth century it was extensively employed. It continues to be so today; for instance, *recycle* or *reconfigure* (Bauer 1983:219). In light of such long-lived productivity, therefore, one would expect new verbs to be formed across the board. Because the morpheme *re-* has

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been productive for a long period of time, earlier forms have undergone a process of erosion, not only phonological and morphological, but semantic as well. As a result, there exist a number of doublets with a difference in meaning.[1] For example, the verb *recoil* 'to spring back' contrasts in meaning with the verb *re-coil* 'to rewind'; as does the verb *recover* 'to regain' as opposed to *re-cover* 'to cover anew'. Constraints on *re-* prefixation appear to be semantic, grammatical, and, as we shall see, pragmatic in nature.

3. CONSTRAINT ON *RE-* MORPHOLOGICAL PRODUCTIVITY. Theoretically, the notion of productivity implies that the English prefix *re-* 'back, again' can be attached to any verbal base to convey a repetition of the situation or event semantically denoted by the verb. That is so, even for those words which already contain the above mentioned prefix, as for instance, the verb *re-reform* 'to re-improve' (Bauer 1983:68).[2]

While recursive prefixation may be considered a pragmatic factor, as it refers to the number of abstractions a speaker can deal with, at a given point in time, other constraints may be phonological in nature; for instance, dissonance may lead speakers away from using possible derivations such as ??*re-rear* in ??*The horse re-reared.* Morphological factors may also inhibit new formations as, for instance, the perception by the speaker of the verbal base as being bound rather than free. Thus, ??*re-clude* is an unlikely formation as opposed to *re-conclude* or *re-include.* Words determined by the speaker as native or non-native may also be a factor in restriction so that the form ??*re-kowtow* (from *kowtow* 'greet') is also an unlikely derivation.[3] Lastly, new derivations may depend on whether or not other affixes, clearly perceived as such, are already present in the base (Aronoff 1976:40–52). Such a perception would make ??*re-mis-take* incorrect, but *re-take* normal.[4]

Syntax also impinges on *re-* prefixation. Syntactic constraints will not allow some *re-* prefixed verbal lexeme to be followed by a direct sentential object. Thus *She retold the story,* or even *She retold the story for her,* sound correct, but ??*She retold her that she would come* does not (Roeper & Siegel 1978:230–54). This is so, because from experience one realizes what sort of things, when told again, are liable to be changed in detail though not significantly; thus *She retold the story* conveys the point of saying something somewhat differently from the way it had been told before, while ??*She retold her that she would come* does not intimate an altered version of the statement ...*she would come.* Semantic constraints may also play a role. For instance, excluded from *re-* prefixation are verbs that denote a telic situation or event. The latter can only be carried out once and is, thus, irreversible. Accordingly, one may not ??*re-drink,* or ??*re-eat* something.

4. Aspect. In analyzing the *re-* prefixation processes, then, the question arises as to whether the meaning of repetition attached to the *re-* prefix 'back, again' is itself a factor in the inhibition of derivations. A cursory inquiry in Latin derivational morphology readily reveals that, even in the source language, the *re-* prefix denoted the conclusion of an act and its reversibility. In Latin, in fact, the prefix *re-* was attached to verbal forms with implicitly complete internal temporal constituency. That is, the morpheme itself indicated, within the sense of the verb, direction to and from a particular point ('back') and completive meaning ('again'). For example, in Latin *dare* denotes both an imperfective and a perfective situation. When the *re-* prefix is attached to the verbal base, the resulting form *re(d)-dare* 'to give back' denotes not only a direction of to and from, but it also emphasizes the implicit internal temporal frame of the verb wherein the action is brought to its conclusion. Comrie (1976:3–5) stated that when a speaker relates (subjectively) a situation in terms of the internal temporal constituency semantically denoted by the verb, that speaker, has in fact, related aspectual meaning.

Indo-European languages have a number of verbal categories representing different values of an event, for example, the continuous and perfective aspect.[5] In the classic languages, such as Latin, Greek and Sanskrit, the markers of these categories of aspect and tense were represented partly morphologically and partly by the so-called *imperfectum* and *perfectum* tenses. In English, such values are generally represented by periphrastic tenses. When the auxiliary *be* (*am/are/is*, etc.) is followed by a verb with the so-called present participial inflectional suffix *-ing*, the tense represents an imperfective notion. In contrast, when the auxiliary *have* (*has*, etc.) is followed by a verb with the so-called past participle inflectional ending *-en*, *-ed*, the tense represents perfective or completive meaning. Clearly, the opposition is between the progressive and the perfect aspect, not at all between tenses. Yet, aspect and tense are connected in so far as an event or situation may be described at the moment of speech as going on or as being completed. That is, there is a relationship between the internal temporal frame denoted by the situation or event (aspect—complete or noncomplete) and the temporal frame at the moment of speech (tense—in progress or completed). Although in English the completive aspect is not a grammaticized category, English does have several devices to indicate aspectual distinctions of completion. Particles such as *up*, *off*, *out*, *through* and so on, convey among other things the copletive aspect of a verb. For instance, in *Jill drank a coke* the verb *drink* is neutral as to completion of the action; but in *Jill drank up a coke*, the verb accompanied by the particle relates the definite completion of the action of drinking. Compare also *tear* as opposed to the phrasal verb *tear off*, or *pull* against *pull out*, or *read* opposite *read through*. Like most Indo-European languages, English has a number of derivational prefixes which relate aspectual information. Like *re-* these prefixes are related to, or derived from prepositions and adverbs: Latin *in-*, as in *include, incline, increase*; or *pre-* (*prae-*) as in: *preclude, prevent, prepare*; or even *con-* as in *conclude, convene, conceal, confess*, and so on.

In modern languages, morphological aspectual opposition is primarily expressed through prefixing, (much less commonly by suffixing); the majority of prefixes so used were formerly also prepositions or adverbs (Comrie 1976:89). In Germanic languages, the most notable example of an aspectual prefix is the Gothic verbal prefix *ga-*, i.e., *slepan* (nonperfective) 'to sleep' and *gaslepan* (perfective) 'to fall asleep' or even, *bindan* (nonperfective) 'to bind' and *ga-bindan* (perfective).[6] The difference here is subtle. In Streitberg's edition of *Die gotischen Bibel*, while the infinitive *gabindan* does occur and translates the Greek aorist infinitive δῆσαι 'no one was able to bind him, that is, do it effectively' (Mark 5:3), the infinitive *bindan* does not. Both forms of the 'past' participle, on the other hand, are attested: *bundans was* 'he was bound', that is, 'inconclusively' (Luke 8:29), which was used for the Greek imperfect indicative ἐδεσμεῖτο; while *gabundans* was 'he had been bound', that is, 'conclusively' was employed for the Greek perfect infinitive διὰ τὸ... δεδέσθαι, (Mark 5:4). In Modern German the prefix *er-* has a perfective notion similar to Russian *po-*, *na-* and so on, e.g., *reichen* 'to reach for something' and *erreichen* 'to attain something'. Other prefixes in deriving new verbs include *ver-*, *be-*, *hin-*, *durch-* and so on. Verbs derived through prefixes in other Indo-European languages bear more than a formal similarity to Slavic aspectual morphological markers. In fact, Germanic languages do not express systematic opposition between perfective and imperfective meaning (Comrie 1976:89). Aspectual opposition by means of a verbal morphological process is largely limited to the formation of the so-called progressive and perfect tenses.

Aspect can, of course, be realized not only by adverbial expressions, by derivational morphology, or through tense opposition, but it may also be an inherent part of the semantics of a verb. Aspectual semantics interact with other aspectual oppositions, 'prohibiting certain combinations or severely restricting their meaning' (Comrie 1976:41). For instance, *roll* describes a situation lasting for an undetermined period of time and relates no information as to completion; it has, therefore, imperfective aspectual meaning. The verb *re-roll*, on the other hand, relates information about completion and has thus a completive sense. Specifically, the action must be completed a first time, with a gap, before it can be carried out a second time. Hence, through the addition of the *re-* morpheme, the verb acquires an implicit completive meaning. Thus, verbs denoting actions, situations, or events which have a durative-imperfective sense are generally incompatible with *re-* prefixation. Following Quirk's (Quirk et al. 1985:201–07) eleven verbal categories (A–K), for instance, 'stative' verbs such as *know*, *be* or *want* (categories A–B), and verbs in the so-called 'stance' category (C), normally shun *re-* prefixation. The 'nonconclusive, nonagentive dynamic durative verbs (category D), such as *rain*; and the 'dynamic punctual' verbs (categories J–K) which reflect transitional events, such as *arrive*, or *leave*, are also generally excluded. The *re-* morpheme is more often compatible with verbs denoting 'conclusive processes', for example, *re-grow*, and 'accomplishments', for instance, *re-discover* (categories F-G). Processes become accomplishments when the activity has a transitive sense, (e.g., *re-write*, *re-approach*, *re-sew*). Thus, dynamic verbs generally imply agentivity (Quirk et al. 1985:1787) and, therefore, a direct object complement. Aspect, of course, is not only connected with tense, but it is also connected with voice. In fact, overt expressions of perfective meaning can be realized in the passive voice, because passive constructions more readily reveal the affect to the object complement of an action (Comrie 1976:84–86).

Thus, the aspectual meaning, implicit in the sense of the verb, has an important role in the process of *re-* prefixation. Ultimately, it is the sense of a verb that determines its grammatical category and, hence, what other elements may or must occur with it in any given clause.[7]

For instance, from a pragmatic viewpoint, a speaker may choose to impart to the hearer his perception of the relation between the subject, and the verb and its complement, so that any given verb, depending on its sense, can belong to more than one grammatical category. Thus a verb like *re-enter* may be classified as both transitive and intransitive.

The perfective sense inherent in the *re-* morpheme causes the *re-* prefix to show a preference for transitive verbs.[8] In English, by building on the verbs' lexicalized voice, tense and aspect,[9] the speaker may manipulate verbal complementation not only for voice, but for tenses (external time), and in our case, through the *re-* derivational process, aspectual sense. Aronoff (1976:35) has already pointed out that pragmatic factors impinge on morphological productivity[10] and therefore they will not be repeated here.

6. CONCLUSION. There are some generalizations that can be drawn from our investigation for the purpose of fostering further studies in this area. The *re-* prefix 'back, again', which earlier simply reiterated the inherent semantic feature of the verb, has begun to acquire an 'aspectual perfectum' function.[11] Such function impinges on its productivity. Because of its perfective aspect, excluded from *re-* prefixing are those verbs which communicate to the listener some kind of durative imperfective sense, i.e., ??*re-own*.

Verbs of emotions and sensory perceptions such as *love*, *hate*, *adore*, also shun *re-* prefixation as they are stative and durative and thus entail imperfective sense. Because, however, formal categories are subject to function, the speaker may use 'stative' or 'stance' verbs with a dynamic sense i.e., *re-hear* (AHD 1976:1099) and *re-lieve* (AHD 1976:1096). Finally, also excluded from *re-* prefixation are telic verbs which denote actions, such as *spend*, or *waste*.

Though completive, they cannot be reversed, nor revised. That is, one cannot go 'back' and ??*unspend*, or ??*unwaste*, and so on.

Of the verbs describing 'dynamic conclusive and durative accomplishments', the action that is undertaken a second time must be revisable. Thus, because the *re-* morpheme denotes the notion of 'back' to the starting point, where possible, by extension, it also connotes quality improvements or contrast. Improvement achieved through repetition (by going 'back' to the starting of the action) is connoted, for instance, in the sentence *I re-wrote my paper.* Indeed, the combination of *re-* with native English verbs is mostly limited to verbs denoting crafts, skills, or techniques: *rebuilding a house* (that has suffered great damage), *remaking a dress* (altering it), *rewriting a paper* (to improve it), *rereading a paragraph* (to make sure nothing of importance is overlooked). In other words, redoing a task which earlier had been carried out unsatisfactorily. As a productive morpheme denoting aspectual perfective meaning, then, the *re-* prefix is generally affixed to transitive verbs. These must be followed by a nominal direct object, rather than a sentential direct object. The constraints on the use of *re-* with regards to sentential complementation noted by Bauer (1983:179) can be explained by syntactic constraints on aspect. For example, a *re-* verb can occur with a finite clause such as the *that-nominalizer*, e.g., (a) *He reasserted that Simpson is innocent, (gone)*, where the implication is that it was done to dispel existing doubt left by the first assertion, but not, (b) ??*He rewrote that you are beautiful, (coming)*, where the rewriting of something implies some alteration or improvement. The meaning of the verb in the relative clause is not semantically associated with the verb of the main clause. In other words, in the above examples, in (a) the sense of the verb *(re)-assert* is that of a speech act verb introducing an indirect statement (DO). The verb remains clearly perfective and conclusive and, hence, transitive, and *in need* of a direct object. The sense of the verb *(re)-write* in (b), on the other hand, remains simply descriptive of a durative activity and is therefore, mainly imperfective, i.e., intransitive as in *He (re)-writes (every day, at home).* The verb *write* may be used, however, to denote a conclusive activity, in which case it is followed by a direct object e.g., *He writes a letter (every day, at home).* As a transitive verb, then, *write* can take the *re-* prefix to denote an improvement. The imperfective meaning inherent in *(re)-write*, however, incompletely affects the direct object even though the verb may be used transitively. Indeed, the use of clausal direct objects impinges on passive transformations (Quirk et al. 1985:163) so that *that Simpson is innocent is reasserted (by him)* is perceived as correct, but ??*that you are coming is rewritten (by him)* is not.[12]

Further syntactic constraints occur with some detransitive verbs. The latter, however, may take *re-* prefixing when the emphasis is on the direct object. Thus, it is acceptable to say *I resent the package through the mail* (it had come back for additional postage), or *I remailed the package* (it had been returned to me). In both instances the emphasis is on the completing of the action and the verb is, in effect, used monotransitively.

It appears, then, that aspectual meaning, in both the prefix and in the verbs, do play an important role in the productivity of *re-* prefixing. The perfective function exhibited by the *re-* prefix is explicable in diachronic terms and accounts for restrictions in the productivity in *re-* prefixation when accompanied by verbs semantically incompatible.

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[1] Productivity is herein defined as the grammatical process that results into a new morphological form; it excludes metaphorical uses which are outside the rules of grammar (Lyons 1977:549).

[2] Bauer (1983:8), for instance, finds *re-retype*, *re-repaint*, and *re-reclimb* not quite 'acceptable' while some speakers find words like *re-re-form* 'to reshape again', or even *re-re-make* 'to remake again', and *re-re-marry* 'to remarry again' acceptable.

[3] By nonnative, a recent borrowing is intended. Thus borrowings that have been in the language long enough to be perceived by native speakers as part of the English vocabulary and, therefore, items subject to grammatical rules are to be excluded. The Chinese word *kowtow* was originally borrowed as a noun (AHD 1976:727). It has been in English long enough to be used as a verb and is perceived by many native speakers as conforming to the canonic shape of English. Yet the word itself is not subject to most of the grammatical rules of English—for instance, as a noun it is not pluralized, although it must be kept in mind that *kowtow* is seldom used and the occasion to make it plural would scarcely arise.

[4] Apart from the meaning of 'take back', *retake* is a synonym for *capture*, while *retake* as a noun is a peculiar development of the movie industry, apparently an outgrowth of *take one*, *take two*, etc.

[5] See Sihler (1995:446–48) for the most recent account.

[6] The form *gabundans* also occurs with the present form of the auxiliary in *gabundans is quenai* 'you are bound to a wife', which translated the Greek perfect indicative δέδεσαι γυναιϰί (1 Corinthians 7:27).

[7] Typically therefore verbs are classified as either copular (followed by an adjectival complement or adverb), intransitive (no obligatory element follows) or transitive (followed by a direct object complement).

[8] Though the *re-* prefix has been attatched to a number of intransitive free verbal bases, most *re-* derivations are with transitive verbs. Out of 10 pages from the *American Heritage Dictionary* (197:1085–95) the first 100 verbs containing the *re-* prefix were surveyed. Only nine of them were marked intransitive. According to the OED, of these nine: *react*, *rebel*, *rebound*, *recede*, *recoil*, *recrudesce*, *recur*, *redound*, *re-echo*, only three have a clear free base (i.e., *re-act*, a calque of Latin *redigĕre* based on the participle *red-āctus*, and first attested in 1644; *re-coil*, a loan from Old French, attested in English during the latter part of the 16th century; and *re-echo*, first attested in 1590).

[9] For an informative account of modality and word-formation, see Rohrer (1974) and Roeper and Siegel (1978).

[10] In addition, newly formed words are still subject to acceptability constraints. Therefore not all words that can be created by employing a particular productive rule are acceptable to all speakers in a general communicative situation. One might occasionally encounter the so-called *nonce* formation, new formations filling a specific need at point in time and based on analogy, but not acceptable in general usage.

[11] The aoristic aspect of the verb is emphasized by the use of the adverb *again*. Contrasts between the difference in usage of *again* and *re-* are part of a forthcoming paper.

[12] Furthermore in sentence (a) the *that* clause has a copular relationship between the subject (Simpson) and its complement (innocent) so that it is semantically associated with the preceding verb. If the copula is omitted the sentence would resemble a SVOC structure.

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PROBLEMS CONCERNING THE NEGATION OF THE MODAL AUXILIARY *MUST* IN ENGLISH

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1. INTRODUCTION. It is a commonplace of English grammatical analysis that with the modal auxiliary *must* the scope of negation is the embedded proposition and not the modality, so that the negative particle bears on the infinitive and not on *must* (Palmer 1990:43, 1979:187; Jacobsson 1979:298; Leech 1987:91; Tottie 1985:89; Quirk et al. 1985:795, 1972:383; Anderson 1971:89). It is customary in this respect to oppose *must not* to *need not* and *not have to,* with the former being said to involve negation of the infinitive, and the latter, negation of the obligation:

(1) a. You mustn't arrive before 8:00.
('You are obliged not to arrive before 8:00')
b. You needn't arrive before 8:00.
('You are not obliged to arrive before 8:00')
c. You don't have to arrive before 8:00.
('You are not obliged to arrive before 8:00')

This distinction also applies to the epistemic sense, as Anderson points out regarding the following pair of sentences:

(2) a. He mustn't be in his study.
('It is necessarily the case that he is not in his study')
b. He needn't be in his study,
('It is not necessarily the case that he is in his study')

It has always seemed odd to me that a negative particle which contracts with the modal auxiliary should be analyzed as negating the infinitive. The intent of this paper is to show that this is indeed incongruous and that in actual fact negation does bear on *must,* in spite of the fact that this would appear to fly in the face of the paraphrases of (1)a and (2)a above.

2. PROBLEMS WITH THE PROPOSITIONAL NEGATION ANALYSIS. Although it accounts quite neatly for the commonly given paraphrases of *mustn't* just

referred to, analyzing negation as affecting the proposition rather than the modal raises a number of other problems. The first of these is the asymmetry which this analysis creates between infinitival negation with *must* and infinitival negation with *can*. With the latter, when the infinitive is negated and not the modal, contraction is never possible. If what one wants to express is 'it is possible for you to not show up at the meeting', only (3)a below will do and not (3)b:

(3) a. You can (always) not show up at the meeting.
b. *You can't (always) show up at the meeting.

With *can*, contraction always indicates negation of the modal and if one wishes to negate the infinitive, *not* has to remain detached from the modal and form an intonational unit with the infinitive. The problem is: why should this be the case with *can* but not with *must*?

A second problem occurs in usage with tag questions. The pattern found with this structure is that a positive verb in the main clause is followed by a negative tag, and a negative main clause is followed by a positive tag. Thus (3)a above, where the auxiliary is positive and the infinitive is negated, would take a negative tag:

(4) a. You can always not show up at the meeting, can't you?

And (3)b, with a negative auxiliary and a positive infinitive, would have a positive tag:

b. You can't show up at the meeting, can you?

With *mustn't*, however, where it is purportedly the proposition that is negated and not the modal, one gets positive tags, as in

(5) We mustn't lose our composure now, must we?

That is to say, *must* behaves as if it were negative, even though semantically speaking negation appears to affect only the proposition expressed by the infinitive.

Another indication of the sentential-negation behaviour of *mustn't* is provided by Klima's (1964) *too/either* test. To a main clause containing infinitival negation with *can* one can conjoin an affirmative clause ending with *too* and not a negative clause ending with *either*.

(6) a. You can always not show up at the meeting, and Joe can too.
b. *You can always not show up at the meeting, and Joe can't either.

However, for *mustn't*, as observed by Horn (1989:506), the conjoined clause must be of the type found with negative main clauses:

(7) a. *You mustn't show up at the meeting, and Joe must too.
b. You mustn't show up at the meeting, and Joe mustn't either.

Once again, *mustn't* shows a split between affirmative semantics and negative syntactic behaviour.

3. DEALING WITH THE PROBLEM. Although the peculiar behaviour of *mustn't* is common knowledge to English grammarians, it has only occasionally been a cause for embarrassment. Palmer (1990:43) finds the form of the tag occurring in sentences like (5) above 'a little surprising'. The best he can offer in the way of an explanation however is to suggest that the form of the tag is 'determined grammatically rather than formally, with the modals at least. A question about the (formally) negative *mustn't* requires a positive tag'. Since in Palmer's view grammar is composed of only two kinds of features, formal features and semantic ones (1988:8), if the reason for the use of a positive tag after *mustn't* is grammatical but not formal, then it must be semantic. Since *mustn't* is semantically affirmative—the negation bears on the proposition—Palmer's explanation is logically incoherent, as it would account only for a negative tag question.

Zwicky and Pullum (1983) and Horn (1989) follow another line of argumentation which hinges on the status of English *-n't*. They propose to treat the latter as an inflection added to verbs to form separate lexical items from their affirmative counterparts. Zwicky and Pullum use as one of their arguments in favour of this analysis that *-n't* is like other inflectional formations in having idiosyncratic, noncompositional semantics; the case cited is the contrast in the import of negation between *mustn't* and *can't*. Horn argues that because *can't* and *mustn't* are inflected negative modals with their own lexical entries, their meanings may be partly unpredictable (i.e., noncompositional), which is why the scope of negation varies idiosyncratically from 'not possible' with *can't* to 'necessary not' with *mustn't*.

While this analysis would indeed account for the semantic asymmetry between *can't* and *mustn't* by putting it off on the unpredictability of inflectional form semantics, it remains problematic as to its central claim that the semantics of modal +-*n't* is idiosyncratic with *must*. As proof of this idiosyncracy, Zwicky and Pullum (1983:509) contend that the connection between contracted and uncontracted negative forms is not the same with *must* as it is with *can*. The uncontracted form in (8)a has exactly the same meaning as its contracted variant (8)b:

(8) a. You must not go home.
b. You mustn't go home.

In contrast, the uncontracted form (9)a has a meaning which is lacking in the contracted variant (9)b, a distinction which is brought out more clearly by the contexts in (10)a and (10)b:

(9) a. You can not go home.
b. You can't go home.

(10) a. A good Christian can not attend church and still be saved.
b. A good Christian can't attend church and still be saved.

This purported idiosyncracy of *must* turns out to be a mere product of insufficient data however. Zwicky and Pullum have overlooked the possibility of a distinction between *must not* and *mustn't* of the same type as that between *can not* and *can't* in (10) above. Thus as a rejoinder to (10), (11)a without contraction would make sense, but not (11)b:

(11) a. There is one sure way to find out if this is really true: you must not attend church and see whether God punishes you.
b. *There is one sure way to find out if this is really true: you mustn't attend church and see whether God punishes you.

If the logical paraphrase depicting the relation between *must* and negation is NECESSARY (NOT P) in both (11)a and (11)b, both of these sentences should be equally acceptable. The fact that they are not shows that it is hasty to assume that negation behaves in exactly the same way in the natural language sentence with *must* as it does in the logical formula.

4. REFINING THE DEFINITION OF THE MODAL AUXILIARIES. What has preceded has brought us to the point where we can see that the problem we are faced with is one of the adequacy of the logical paraphrases used to characterize the meaning of the modals. Sentences (11)a and (11)b above show a semantic distinction between *must not* and *mustn't* which is not capturable by a logical formula which operates with the terms NECESSARY, NOT and P, combinable either as NECESSARY (NOT P) or as NOT (NECESSARY P). I argue that the equating of the meaning of *must* with the notion of NECESSITY represents a very

superficial description of the modal's semantic content which leaves aside certain aspects of this content which are pertinent for its interaction with negation. More specifically, I argue that the modals evoke various forms of nonreality or potentiality and consequently that the effect of negation on them is not always the same as with other verbs because one is not negating reality but rather negating something already conceived as a non-reality.

The claim that the modals evoke nonreality as nonreality is based on the following evidence:

a. absence of *-s* ending in the third person singular
b. use of past tense forms to evoke irrealis outside of hypothetical contexts
c. absence of *to* before the infinitive.

The absence of *-s* in the third person singular indicates a parallel between the modal auxiliaries and the subjunctive mood: both express nonreality, the modals lexically and the subjunctive grammatically. As for (b), normally the past tense requires the presence of some hypothetical element such as *if* or *wish* governing the clause in which it occurs in order to evoke irrealis:

(12) a. If I knew Japanese...
b. I wish I knew Japanese.

The past tense of the modals however can evoke irrealis in a main clause, as in (13), which indicates that the meaning of the modal itself is enough to provide the notion of hypotheticalness necessary for *-ed* to express irrealis rather than simply past time.

(13) You could be fired for doing that, you know.

Regarding the construction of the infinitive found after the modal auxiliairies, I have shown elsewhere (Duffley 1992) that the absence of *to* is attributable to the fact that the modals are not felt to evoke something real enough to be able to constitute a before-position with respect to the infinitive's event.

Given that the modals evoke nonreality, their interaction with negation poses special problems. Logical negation is defined as absence from existence, but the modals denote things which are already conceived as absent from reality in certain respects. The problems therefore are: (1) Can one deny the existence of something which is not fully a reality? (2) Can negation have some other effect than that of denying the existence of something?

The answer to the first question is: yes, depending on the kind of nonreality being negated. With the modal auxiliary *can*, negation bearing on the modal seems indeed to play the role of denying the existence of the possibility of the infinitive event's realization:

(14) I can't swim.

However, in other cases I argue that negation bearing on a non-reality is not conceived as denying the latter's existence but rather as coalescing with the potentiality and giving it a negative colouring or orientation, i.e., making it a negative potential rather than a positive one. This is what occurs with *must.*

As a more appropriate description of the meaning expressed by this modal, I offer the following: *must* evokes a state of potentiality in which there is some compelling force impinging on the subject and leaving little or no latitude for non-realization of the infinitive's event (compare Sweetser's force dynamics definition of *must,* 1982:486). What negation does is to give a negative orientation to this potentiality, and so to produce the effect of a force of the same type, but negatively oriented with respect to realization, thus giving rise to the notion of prohibition. Here we have a case then where negation, rather than denying the existence of something, combines with the notion conveyed by the modal verb to create what could be called a negative modality.

In order to perceive this, however, one must go beyond the logical concept of negation as 'absence from existence' and become aware of the fact that negation can serve other conceptual functions as well. And one must also go beyond the definition of the modal auxiliaries as exponents of the logical categories of necessity and possibility to see that English gives special status to such notions, treating them as non-real. The lesson to be learned from the study of the problem of negation with *must* consequently is that logical categories are not always sufficient as tools for understanding the semantic workings of natural language. In the case of *must,* defining the latter as denoting the existence of 'necessity' and treating negation as a denial of something's existence makes it appear as if negation is not applying to the modal in the form *mustn't.* A more adequate analysis of the modal's semantic content opens the way however to the realization that *must* is indeed negated, but that negation is playing a different conceptual role here which is compatible with the special kind of meaning denoted by the modal.

As a postscript to this conclusion, I would like to add a consideration about how negation behaves with certain other modal auxiliaries. The point I would like to make concerns a correlation which needs to be explored between the behaviour of negation and the capacity of evoking past time-sphere with the English modals. It seems to be the case that the modals with which negation behaves most regularly are those whose past form is still capable of evoking past time—*can* and *will.* And conversely, the modals with which negation shows the peculiar behaviour of coalescing with the modality rather than denying the latter's existence are those which either have no past form (*must*) or whose preterit is practically no longer used with a past time value (*may*). If this is verified, it would constitute a decisive piece of evidence in the case made in this article that it is the ambivalent status of the English modals with respect to reality which causes their ambivalent behaviour with respect to negation. I have focussed mainly on the fact that English treats the modal auxiliaries as evoking nonreality. However, there is one indication that they are also partially treated as realities—the fact that they make a distinction found only in the indicative mood (the 'fact-mood', cf. Jespersen 1924:313), namely that between past and present time-spheres. It would certainly seem to be no accident that the modals where the past vs. present time distinction has maintained itself most strongly are those where negation can be conceived as denying the existence of what the modal denotes; on the other hand, those where the past tense form is nonexistent or practically confined to the expression of the hypothetical, not being treated as realities with respect to time (or at least to past time), are not treated as realities with respect to negation either. Further research is needed however in order to systematically explore the ramifications of this hypothesis.

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TIME AND CAUSE IN THE ENGLISH CONNECTOR *AS*

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1. THE PROBLEM.* The English word *as* plays a tremendous variety of roles in English, including that of a connector, a role in which it can be used to link verbal events either causally or temporally:

(1) As he was 18, he could drink. [Causal interpretation]

(2) As she was on her way home, she ran into an old friend. [Temporal interpretation]

(3) As you go down Main Street, pick up a box of Coronas for me. [Temporal or causal interpretation] (Quirk et al. 1985)

In its connective capacity, *as* raises a number of interesting questions which have been left largely unexamined over the years. For instance, one might wonder what conditions must be met for each of the interpretations to result. Moreover, given that *as* cannot be replaced by another connector of time (*when*, *while*, etc.) or by another connector of cause (*because*, *since*, etc.) without giving rise to a measurable change in expressive effect, it can be assumed that it evokes a particular form of both temporality and causality. One might therefore wonder about the source of the uniqueness of the temporality and the causality evoked by *as* and about how the two might be linked. It must also be kept in mind that the problem of the temporality and causality evoked by *as* is ultimately a small part of a much greater picture. Whatever explanation is arrived at for the temporal and causal aspects of as must therefore also prove to be compatible with the various other functions of the word, including its comparative and instrumental uses (*He was as hungry as a bear, She served as Prime Minister, They used the knife as a screwdriver*). Furthermore, the theory of *as* ultimately developed will also have to prove compatible in a very general way with what can be observed in the case of the numerous connectors which do both temporal and causal duty in English, in other Indo-European languages, and in languages from different language groups.

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* This subject is treated in considerably more detail in the MA thesis of Sylvia Pilisi done under my supervision (Université du Québec à Chicoutimi, 1996). This paper owes much to the fine example collecting and research work of Mme Pilisi.

2. THE CURRENT STATE OF RESEARCH. *As* per se has attracted surprisingly little linguistic attention and does not seem to have been treated in systematic fashion as a single word in any study. Grammar books tend to treat *as* under a variety of different headings according to its grammatical function. Edgren (1971) deals with temporal uses of *as* in a broad study of temporal connectors, but does not consider its causal uses. Conversely, Heinämaki (1978) and Fang (1992) deal with causal *as*, but not the temporal version. One of the few writers to attempt any theorization touching on both uses of *as* is Adamczewski (1982), who tries to work the connector, rather unsuccessfully, into his rhematic/thematic opposition. Shyldkrot (n.d.) deals with the relationship between time and cause, but for French rather than English. The net result is a rather patchy and highly unsatisfactory grammatical portrait of *as* in its connecting role.

Despite the sketchiness of the work done thus far on *as*, there are a few points made that are worthy of retention. Several writers remark—without any attempt at explanation—that *as* is a weak or neutral connector, particularly in causal terms. This point clearly needs to be explored given the frequency with which it is found in prescriptive grammars. A number of others comment on the fusion of time and cause. They observe that any relationship that poses one event as preceding another sets up conditions comparable to those that exist in a situation of causality. These authors often suggest—as will this study—that time and cause appear to be two faces of a single reality. Finally, almost all writers comment on the impression of simultaneity that predominates in the case of temporal *as*. Unfortunately, no one goes on to study how this impression is created, how the simultaneity of *as* differs from that of *while*, or how it might be reproduced in a causal constructions with *as*.

In short, previous studies involving *as* have been few in number and generally very limited in scope. Although this one is far from complete and definitive, it does differ from those that have come before in that it marks a first attempt to understand how and why *as* can link events in both temporal and causal relationships. It also assumes that *as* is a single word in English, despite its many uses, and therefore starts from the premise that any explanation of the connective role of *as* must also have the potential to explain the various other uses of the word.

3. EVENTS EVOKED BY VERBS. Since temporal and causal uses of *as* involve the linking of two verbal events, it is useful to set down a few basics concerning the nature of events before looking at how *as* situates them with respect to each other. For a verbal event to be recognized as such, it must be perceived

to have a distinct beginning and end; without these thresholds, an event cannot be distinguished or set off from any background. Between these thresholds can be lodged as many instants as are necessary to cover the full duration of the event, either a single instant or many instants.

The instants lodged between the beginning and the end of an event can be perceived in two different manners: either they are all perceived to be identical to each other and therefore unopposable, with the result being an event which is static or monophase in nature, or they are all perceived to be different and therefore opposable, with the result being an event which is dynamic or multiphase in nature. In the case of a monophase event, the relationship of the subject to the verb is necessarily constant and unchanging, while in the case of a multiphase event, the relationship of the subject to the verb is in constant evolution. From one instant to the next the subject can be seen to realize a different phase of the event.

Once a line is drawn between monophase and multiphase events, it becomes easier to comprehend the conditions which give rise to either temporal or causal interpretations of the connector *as*.

4. TEMPORAL *AS*. Temporal *as* plays a dual role within an utterance. It has an impact on the interpretation to be given to the verb within its own clause and it also has an impact on the way in which the principal and subordinate clauses are situated with respect to each other. For this reason, it is useful to examine the impact of *as* in each situation.

4.1 TEMPORAL *AS* WITHIN ITS CLAUSE. The most revealing thing about temporal *as* is that it is not found in all contexts. For instance, it does not occur when the verbal event in its clause is of a static nature:

(4) As you are here...
As you know...
As he wore a red sweater...

In addition, temporal as is not generally found with a verb in the perfect form:

(5) As he has finished...
As they had played...

Edgren (1971) has found one exception to this tendency in a very extensive corpus of examples of temporal *as*:

(6) Just as I had packed my possessions ready to leave home, I developed chickenpox. (Edgren B32.7)

It is significant that this example includes *just.* It will be argued below that the presence of this word—which is incompatible with causal *as*—ultimately provides the conditions necessary for a temporal interpretation to result.

Temporality would also seem to be incompatible with the negation of the event in the subordinate clause:

(7) As she wasn't working...
As you don't go down Main Street...

It is also generally incompatible with modal auxiliaries:

(8) As she can run fast...
As they might come early...
As he will be working on Sunday...

There is however a use of *would,* to be discussed below, which can be found with a temporal interpretation of *as*:

(9) As he would potter about in the garden, she would knit.

The incompatibility observed between temporal interpretations of *as* and certain verb forms can be understood when reference is made to the monophase/multiphase distinction made in the previous section. In the case of stative verbs, the event evoked is unquestionably monophase in nature. The same is true of the perfect, which places the subject in the static aftermath or result phase of a preceding event. When an event is negated, the subject is, in a sense, refused access to the event, not allowed to realize it. Its position is therefore unchanging with respect to the event, exactly as is the case in monophase events. Modals, in potentializing events, create another type of stable, unvarying relationship between the subject and the verbal event. The potential created by the modal is constant for the duration of its existence. Thus, in every instance where a temporal interpretation of as proves impossible, the verbal event evoked in the subordinate clause is monophase in nature and the relationship between the subject and the verb is constant and unchanging. In other words, if no two instants of the verbal event can be opposed, a temporal interpretation cannot occur.

Before considering the apparent exceptions noted above, it is useful to examine cases in which a temporal interpretation of *as* is possible in order to assess the impact of the connector on its clause. When it occurs with a simple form, *as* seems to situate the subject before the end of the event and slow the cadence. The following examples provide a basis for comparison. In the absence of *as*, the subject is perceived to have reached the end of the event. In the presence of *as*, the subject is caught in the act of realizing the event:

(10) a. He caught the ball...
b. As he caught the ball...

(11) a. He walked down the street...
b. As he walked down the street...

(12) a. I pull a rabbit from my hat...
b. As I pull a rabbit from my hat...

With the progressive form, the addition of *as* does not result in the same degree of change in interpretation. This would suggest that the progressive form and *as* might well play similar roles within the clause, probably in that they both situate the subject somewhere between the beginning and the end of the event:

(13) a. He was catching the ball...
b. As he was catching the ball...

(14) a. He was walking down the street...
b. As he walking down the street...

(15) a. I am pulling a rabbit from my hat...
b. As I am pulling a rabbit from my hat...

Two additional observations are also worthy of attention. Contrary to original expectations, temporal *as* occurred more frequently with simple forms than with progressive forms in the corpus consulted. However, the make-up of the corpus—which included a high number of magazine articles—might have contributed to this skewing of results. Even more significantly, it was discovered that it was very difficult to get an temporal interpretation from impersonal verbs (*rain, snow, hail*, etc.) and from the verb *wear*. The problem was found to be particularly acute in the progressive form.

When all of the various observations are combined, a portrait of temporal *as* begins to emerge. The connector situates the subject between the beginning and end of the verbal event, and follows its progress over more than one instant of the event's development. For this to happen the verbal event has to be multiphase in nature, thereby allowing for the opposition of at least two different instants in the event. This, in turn, explains the affinity observed between temporal *as* and the simple form and the lesser compatibility of the progressive form. The simple form evokes an event in its totality; when it is used, all of the instants of the event are either seen or forseen. In contrast, the progressive, which uses *be* as an auxiliary evokes a single instant of the event. This difference in the representation of events has clear consequences for *as*. When the simple form is used to evoke a dynamic, multiphase event, the conditions for the existence of temporal *as* are necessarily met since at least two opposable instants are evoked. In the case of the progressive form, however, the conditions for temporal *as* are not automatically met since only a single instant of the total event of the lexical verb is evoked. A temporal interpretation is of course possible, since the event represented by the progressive is seized in its development, thus implying that it is not complete and that other instants are likely to exist. These instants are not, however, explicitly evoked as they are in the case of the simple form.

As for the impersonal verbs and *wear*, which are rarely found in temporal uses, they are not verbs which usually allow for a dynamic relationship between the subject and the verb because the verbal events they evoke tend to be pretty much the same from instant to instant. Moreover, in the case of the impersonals, it is difficult to imagine what the subject is, let alone imagine it somewhere in the on-going process of snowing or raining. It is only when the process is clearly graduated—suggesting that the different instants of the event are opposable—that a temporal interpretation is possible:

(16) As it rained, the boat slowly filled with water. [Temporal or causal interpretation]

This brings us to the previously evoked problem of the 'exceptional' temporal uses of *as* with the modal *would*.

(9) As he would potter about in the garden, she would knit.

What is interesting in this case and similar examples is that the event has two states of existence. In one state, the modality of *would* characterizes *potter about the garden* as a habit and the focus is the potentialization of the event. In the other state, the repeated realization of the event comes to the fore and the focus falls on actualization instead of potentialization. This means that the event in (9) is at once a potential event and a previously actualized event. When the subject is imagined in the actual process of pottering about, the actualized aspect dominates and a temporal interpretation of *as* becomes possible. In contrast, in its purely *conditional* use, *would* is not compatible with temporal *as*.

It is also possible to explain the other 'exceptional' case mentioned above: the fact that the addition of *just* to *as* always results in a temporal interpretation, even when the verbal event evoked after it would not normally allow for a temporal interpretation:

(6) Just as I had packed my possessions ready to leave home, I developed chickenpox. (Edgren B32.7)

Just as can be paraphrased by 'the very instant' and would therefore seem to narrow the event to a single instant and make a temporal interpretation impossible if what has been argued thus far is true. *Just*, however, necessarily evokes more than a single instant because it marks a threshold, the point at which two events join, and can be discerned only when two different instants can be opposed. Thus, the presence of *just* ensures that the fundamental condition for the existence of temporal *as* is fulfilled.

4.2 TEMPORAL *AS* WITHIN THE SENTENCE. Within the broader framework of the sentence, *as* plays two roles which seem to be contradictory. It serves as a connector of simultaneity and it also situates the event of the principal clause within the development of the event of the subordinate, thereby posing one event in a position of anteriority with respect to the other. This gives rise to the paradox of *as*: on the one hand the connector expresses simultaneity, while on the other it suggests the existence of a before/after relationship.

This paradox can be resolved only when one considers the nature of each relationship. The simultaneity evoked by temporal *as* resides in the dynamic, coincidental chronological development of two events. In contrast, the consequential relationship is static rather than dynamic, logical rather than chronological.

The paradox of *as* is in fact the paradox of linguistic expression in general, and *as*, particularly in its temporal manifestation, can be regarded as a solution to a fundamental linguistic problem. We can perceive more than one thing at one time, but given the linearity of language, we cannot express more than one thing at one time. All linear forms of expression must constantly compensate for their linearity, and *as* is one form of compensation. *As* indicates that two events arranged consecutively by necessity were perceived simultaneously and, in a sense, share a common space by overlapping in their development.

The overlapping of events evoked by *as* comes through clearly when *as* is contrasted with *when*, a temporal connector that simply marks the point at which two events come together.

(17) a. She was photographed as she left the room.
b. She was photographed when she left the room.

In (17)a, the subject is photographed on the way out of the room, whereas in (17)b the picture is taken after she has left the room.

The way in which temporal space is shared by the overlapping events connected by *as* is also pertinent, since there is another connector, *while*, which also places two events within the same time-frame. In many instances it is well nigh impossible to detect a difference in expressive effects between the two, but there are nonetheless a few pertinent examples where the two connectors take separate paths and where the impact of *as* can be assessed:

(18) a. As he grew older, he grew wiser.
b. *While he grew older, he grew wiser.

(19) a. As the leaves change colour, the scenery becomes even more spectacular.
b. *While the leaves change colour, the scenery becomes even more spectacular.

If the focus is on the development of the verbal event rather than on the time-frame within which the development occurs, only *as* is possible. This suggests that the simultaneity of *as* entails more than the simple coincidence of two events. One event is situated not only within the time-frame of the other, but also within the development of the other, using at least two different instants as a support.

When all of the observations made thus far concerning temporal *as* are compiled, the result is a short list of pertinent, defining features of the connector. *As* is used first and foremost to situate two events in a relationship of total or partial simultaneity. The simultaneity is perceived to be dynamic or developmental in nature since it covers at least two different instants of a multiphase event. In addition, the event of the subordinate clause is recognized as preceding that of the principal clause logically. This means that even in temporal *as* there is an element of the logic strongly evocative of a relationship of causality.

5. CAUSAL *AS*. Although the problem of causal *as* has not yet been addressed directly, much has already been said in an indirect manner through the discussion of temporal *as*.

5.1 CAUSAL *AS* WITHIN ITS CLAUSE. Unlike temporal *as*, causal *as* can be found with all verb forms and tenses. It is nonetheless restricted in its use since it is found only in cases where the verbal event found in its clause is of the monophase variety and where no individual instants can be discerned. In these cases, the subject is no longer perceived to be realizing the event one instant at a time. The event is instead perceived as an attribute of the subject. This can be seen clearly through an examination of Quirk et al.'s (1985) ambiguous example:

(3) As you go down Main Street, pick up a box of Coronas for me.

In the temporal interpretation, the speaker imagines the subject on his way down the street, passing in front of a variety of stores and houses. In contrast, in the causal interpretation 'going down Main Street' is perceived to be part of the listener's normal route and the subject is not seen to be in the realization phase of the event.

A study of causal *as* shows that the subject can enter into a stable relationship with a verbal event in several different ways: the event can come to be seen as a potential acquired by the speaker (*as you can speak Chinese*); the event can be perceived as a result acquired by the speaker (*as you have finished the assignment*); the event can be attributed to the speaker as a characteristic (*as you know*). Causal *as* is therefore distinct from temporal *as* in that it does not allow for any evolution in the relationship between the subject and the verb. The incidence between the two is constant throughout the duration of the event.

5.2 CAUSAL *AS* WITHIN THE SENTENCE. The remarks made thus far have focused primarily on causality in general, but not on the particular nature of the causality found with *as*. To focus more specifically on *as*, it is necessary to consider the role of the connector within the broader context of the sentence and to contrast its workings with those of *because* and *since*. The following examples, borrowed from Davison (1970), provide an excellent starting point for a more detailed analysis of the type of causality evoked by *as*:

(20) a. As you are an expert on antique paperclips, what do you think of my collection? (Davison 191)
b. ?Because you are an expert on antique paperclips, what do you think of my collection?

While (20)a is fine, (20)b is very odd indeed. In (20)a, the asking of the question that constitutes the principal clause of the sentence is dependent on recognition of the listener's expertise in the field of antique paperclips. In other words, it is the expertise of the listener that renders the speaker's question possible. Example (20b) is odd because the connector used is one that suggests that the two clauses are in a cause/effect, before/after type of relationship, but that is not the case. The question does not follow after the expertise of the listener, but is instead conditioned or made possible by the expertise. In other words, the expertise of the speaker provides an underlying support for the question.

Much the same thing happens in examples (21)a and (21)b, where the former strikes one as being more normal and certainly more polite. This is because the possession of money conditions the subject's ability to pay but does not cause it. Example (21)b verges on rudeness because it seems to oblige the person to pay by setting up a cause/effect situation:

(21) a As you have money on you, you can pay.
b. ?Because you have money on you, you can pay.

In (22) and (23), where the two clauses overlap little or not at all temporally or logically, *because* is far more normal, and *as* shifts towards a temporal interpretation.

(22) a. Because he lit a match too close to the gas can, it exploded.
b. As he lit a match too close to the gas can, it exploded.

(23) a. He was arrested because he committed a crime.
b. He was arrested as he committed a crime.

What is interesting to note here is the inability of *as* to sustain a causal relationship when the clauses are not in a logical order, whence, no doubt, the comments from numerous grammarians concerning the weakness or neutrality of *as*. The explanation for this 'weakness' or 'neutrality' is not hard to imagine. The role of *as* is simply to open up a space for two events to co-occur and indicate that the event in the subordinate clause serves as the referential frame. When the logical order of the sentence is reversed, it is normally to focus attention on the event of the principal clause. In this case, the subordinate declines sharply in importance; after all, providing a referential framework for the event of the principal clause after evoking it serves little purpose. In such circumstances the subordinate functions more as an adverbially complement modifying the event of the principal clause than as a subordinate clause providing a referential framework.

Contrasting *as* with *since* highlights another characteristic of the causality of the connector.

(24) a. Since you're so smart, you do it!
b. ?As you're so smart, you do it!

Rather curiously, only (24a) is suitable for expressing the sarcasm normally associated with the utterance. This is due to the actualizing nature of *as*. The speaker in (24) does not really consider his listener to be smart and does not think that he can do any better than himself at the task. He must therefore colour the affirmation *you're so smart* in hypothetical tones to undermine its reality. If *as* is used, the smartness is posed as being real because it is represented as a condition upon which the consequence constantly depends. In contrast, *since* does not introduce a conditioning event. It instead evokes a logical or temporal starting point and does not call attention to the conditioning effect of the situating event on the situated event. This means that *since* can be used to express the unreal or counterfactual, while *as* does not lend itself so well to the task.

6. TIME AND CAUSE. On the basis of the evidence presented thus far, it can be argued that there is no temporal *as* and no causal *as* per se. There is simply a connector *as* that indicates that two events represented linearly in discourse were perceived simultaneously. This conclusion can be drawn because the temporal and causal uses of *as* show a series of common characteristics. In both cases the two events coordinated by *as* are overlapping and interrelated at every instant. One event supports the other through the duration of the period of coincidence, and, at the same time, also serves as a framework within in which the supported event is situated. In the case of temporal *as*, the support provided is chronological; every separate instant of the situated event follows a separate instant of the situating event. In the case of causal *as*, the entire situating event supports the situated event by rendering it possible for however long it lasts.

The temporal/causal distinction is not made by *as*, but is instead made possible by *as*. If the verbal event evoked by the subordinate clause is perceived to be composed of opposable instants, a temporal interpretation results. If the verbal event evoked by the subordinate clause is perceived to be composed of nonopposable, indistinguishable instants, the result is a causal interpretation, as time is frozen and therefore potentialized. In a sense then, cause is simply the result of a potentializing of a temporal relationship, and time and cause two are faces of the same reality.

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AN INVESTIGATION OF LEXICAL BORROWINGS FROM FRENCH IN QUEBEC ENGLISH

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THE VARIETY OF ENGLISH* used in Quebec is distinctive especially on the lexical level from varieties of English used elsewhere in Canada and in North America. Quebec English is distinguished, in particular, by the marked influence of French: recent research has shown evidence of the regular use of lexical borrowings from French in both written and spoken discourse. As part of this growing body of research, the Université de Sherbrooke has recently undertaken an investigation of English usage in Quebec.

Quebec provides a particularly dynamic and active setting for scholarly research into languages in contact, and research activity has been prolific in the last thirty years. An impressive body of linguistic research into contact phenomena has emerged from that region. Wallace Lambert's sociolinguistic studies of attitudes towards language variation and Shana Poplack's research into aspects of language borrowing both within and outside Quebec are but two well-known examples.

On the federal level, Canada has two official languages, English and French, established by the Official Languages Act of 1969 as the official languages of Parliament and federal government services. However, French has been and remains the language of the minority, other than in Quebec, the one predominantly French province; thus the French language for centuries has been on the defensive against domination by English as the language of prestige and of business and economic advancement. But the linguistic balance of power in Quebec has changed radically in the past thirty-odd years. Within Quebec itself, the advances for French have been impressive. Modernization of Quebec society in the 1960s led to the rise of the Québécois nationalist movement based largely on the protection and promotion of French within Quebec as a means to ensure the survival of the French-speaking community. The early 1960s saw the beginning of language planning in

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Quebec, with the creation of the *Office de la langue française.* In 1974, the *Loi sur la langue officielle* made French the only official language of Quebec. The dominant position of French was firmly established by Bill 101, the *Charte de la langue française,* in 1977. Since then, Quebec has seen concentrated efforts and aggressive language policies to ensure the use of French in Quebec in all walks of life. These language policies have been remarkably effective and have resulted not only in increased vitality, recognition and use of French as compared to English, but also in Quebec French being increasingly recognized as a legitimate and standard variety of French in its own right. The relation between Standard French, or so-called 'French French', and Quebec French has been reevaluted, with the *Office de la langue française* and Québécois academics supporting the emergence of Quebec French as a reputable standard with as much prestige as Standard French. Richard Bourhis observes, 'The general atmosphere in favour of French in Quebec seems to have raised the status of Québécois French relative to both the English language and standard French' (1982:59).

On an academic level, the interest in Quebec French and the influence of English on it has been staggering. Bourhis (1982:35) states:

> Quebec...remains the most active centre for the investigation of language attitudes in the Francophone world.... Indeed, much of the techniques and knowledge developed for the social psychological investigation of language attitudes was generated in the Quebec setting.

Recent years have seen the publication of literally thousands of articles and monographs on Quebec French, as well as a number of dictionaries on Quebec usage (Poirier 1985; Beauchemin, Martel & Théoret 1992).

A good deal of this interest in Quebec French has encompassed the question of borrowings from English. The *anglicisme* is seen by prescriptivists as something to be avoided, as a threat to the survival of the French language. Dictionaries of anglicisms, such as Colpron's *Les anglicismes au Québec* and the more recent *Le Colpron,* list borrowings from English that are common in French and provide the correct French alternatives. Complete courses intended to eradicate anglicisms from students' writing are compulsory parts of the curriculum in French writing and translation programs at Quebec universities. Chantal Bouchard (1989) refers to anglicisms as 'une obsession nationale'. Although concern for anglicisms is evident as well, to a lesser degree, in France, where the *Dictionnaire des anglicismes* was published in 1982 by Larousse, the attitude there is considerably more permissive.

This strong resistance to borrowings in Quebec French contrasts with the relatively casual attitude toward gallicisms in Quebec English. With English speakers in Quebec having easy access to American and English-Canadian media, publications, and entertainment to support their use of standard English, the survival of their language is less at risk. Although Roberts (1982) warns that the tendency towards Frenglish within the small English-speaking Quebec community may be detrimental to that community's ability to communicate outside the province, the occurrence of gallicisms has not been the subject of alarm. Interference is viewed as problematic primarily for learners of English as a second language, where it reflects a lack of competence in English. This nonchalance reflects the relatively casual attitude of English-speaking Canadians towards their language in general. In Orkin's words:

> [The] lack of concern which most English-Canadians show towards their daily speech contrasts sharply with the interest of a great many French speaking Canadians in their distinctive variety of French... French is the language of the minority only, with the result that the study of Canadian French has often been as much a matter of ethnic and political self-assertion as it has been of linguistic research. (1971:3)

Interest in Quebec English has been much more modest than interest in Quebec French. Although the borrowing of French-Canadian words into Canadian English had been observed since colonial times (Avis 1978), early studies of English in Quebec focused mainly on the influence of British and American Englishes. For example, Hamilton's 1958 article 'Notes on Montreal English' explores whether English in that city bears a closer resemblance to North American English or to British English. Similarly, although Orkin (1971) mentions a few words borrowed from French into Canadian English, he has little to say about the influence of French on Canadian English and, like Hamilton, concentrates on the influences of British and American Englishes on English usage in Quebec.

Recently, some interesting research has been undertaken into Quebec English within the larger context of Canadian English. For example, the Strathy Language Unit of Queen's University in Kingston, Ontario, which is mandated to study Canadian English usage, has a keen interest in the issue of English in Quebec, and the former director of the unit, Dr. Margery Fee, has written several papers on the topic. Lexicographic descriptions of Quebec English are also being carried out, mainly within the larger framework of Canadian English lexicography. Two major dictionary projects are currently underway in the field of Canadian English: first, the Oxford Canadian Dictionary Project, centered in Toronto, is scheduled to publish an Oxford dictionary of Canadian English in 1998. Similarly, the Bilingual Canadian Dictionary Project, a joint project of researchers at the University of Ottawa and the Université de Montréal, will be publishing a French-English Canadian dictionary. Other research underway includes the compilation under the direction of Nancy Belmore of a corpus of spoken Canadian English at Concordia University in Montreal as a component of the International Corpus of English (ICE).

Scholarly interest has been manifested recently in the publication of a number of articles. Roberts (1982) was one of the first to raise the issue of what she terms 'Frenglish'—'English (including integrated French borrowings) containing or spoken with non-integrated borrowings called gallicisms'. Plaice (1984) gives examples of interference in English observed in official publications and the media in Quebec. Palmer and Harris (1990) carried out a diachronic study of English language public documents in Montreal to show that increased influence of French on English had resulted from the increased prestige of French. McArthur's book *The English Language as Used in Quebec: A Survey* (1989) describes a survey of the acceptability of 25 expressions identified as gallicisms. More similar to the Université de Sherbrooke project is the work done by researchers who have searched Quebec English newspapers for evidence of gallicisms. Manning and Eatock reported their findings at the LACUS meeting in 1982. Fee has undertaken a systematic computerized search for gallicisms in the Quebec-English press and reported on her findings in articles from 1991 and 1995. This growing interest reflects in part the increasingly distinctive character of Quebec English.

The distinctive character of Quebec English has become increasingly apparent in the last two decades for several reasons. First, a growing number of Quebec anglophones are bilingual, with French being the language of the provincial government in the workplace and with the English-language school system promoting bilingualism at all age levels. Second, Quebec government language policy has entrenched the use of French designations for many provincial, geographic, social, and political realities, and these designations are used by anglophones as well as by francophones. Third, with English assuming the role of a minority language in an increasingly independent Quebec, the decreased prestige and vitality of English within Quebec has left it more susceptible to borrowings from French.

As part of this growing interest in Quebec English, a research project has been launched at the Université de Sherbrooke, based on the compilation and analysis of a corpus of journalistic, administrative and literary texts written by English-speaking Quebecers. The objectives of our research are as follows: first, to identify lexical items in Quebec English that appear to be influenced by French; second, to describe their occurrences, to categorize them, and to analyse the contexts of their use, their variants, and their semantic fields; third, to study evidence of the degree of their assimilation and integration into the grammar of English; and fourth, to study differences in strategic use and apparent receptivity to borrowings in the different written genres of our corpus.

Our research rests on the hypothesis that a standard variety of English distinctive to Quebec does exist. In our view, a corpus of written texts produced for relatively formal and public intergroup communication reflects usage that can be presumed to have acquired a certain level of acceptability. Ryan, Giles and Sebastian (1982)note that informal uses in speech are less indicative of acceptance 'and enjoy less social prestige' than do uses in more formal outgroup occasions, and that 'analyses of language use in the public domain (press, broadcasting, government and business documents, and literature) provide the basis for descriptions of the standard language, even for dictionaries...' (1982:7). Fishman observes, 'variants which are used in written communication are much more likely to be standardized than those which are used solely in the oral modality' (quoted in Ryan, Giles & Sebastian 1982:3). It can be presumed that informal speech would reflect more interference than formal written or spoken discourse; Poplack reports four times as much code switching in informal than formal speech (1983:113). Therefore evidence of interference in the edited published texts of our corpus is all the more significant.

There are currently no dictionaries or style manuals of Quebec English, although a City of Montreal Style Guide is scheduled to be published in the fall of 1996 by Victor Trahan of the Montreal City Clerk's Office. In the absence of any codified norms describing Quebec English usage, findings based on usage observed in written publications of social institutions appear to be a reliable indication of standardized usage.

An advantage in choosing a written corpus is the increasing availability of machine-readable material, for example, commercial CD-ROMS and software tools for text searching, such as Gofer and TACT (Text-Analysis Computing Tools, a share-ware package developed by the University of Toronto's Centre for Computing in the Humanities). Like Fee, we are using the Canadian NewsDisc on CD-ROM in our journalistic corpus.

METHODOLOGY. The first stage of the Université de Sherbrooke project has been to assemble the corpus. At this point, we are working on the journalistic and administrative components; the literary component will be assembled later. Our present corpus, which is constantly expanding, consists of both electronic and paper texts. CD-ROMS of the Montreal daily, *The Gazette*, and scanned issues of the Quebec City weekly, the *Chronicle Telegraph*, make up the electronic journalistic corpus, with paper copies of the numerous weekly and monthly English-language community newspapers from throughout Quebec as a complement. The administrative component consists primarily of paper copies of annual reports and other publications of English-language school boards, English-language hospitals, and English-language associations and rights groups from throughout the province. The corpus also includes provincial government publications, some of which are no doubt translations. Paper versions of English tourist information brochures have been gathered from numerous sources. The primary electronic component of this part of the corpus consists of the annual reports of Quebec businesses available in electronic form on CanCorp Plus. Our study is synchronic: all texts studied date from 1990 forward.

These publications all have in common that they were written by English-speaking Quebecers. Most were written originally in English, although some business and government documents may be translations. We presume the written form of English used in these edited published texts to be representative of accepted or standard usage of English in Quebec.

Through extensive reading, finding references to gallicisms identified by others working in the field, and consulting with other researchers, we have compiled an open-ended list of some 150 words or expressions that appear to reflect usage distinctive to Quebec. Subsequent steps are to establish that each term is indeed distinctive to Quebec, by consulting dictionaries and English speakers from regions outside Quebec; to establish that each term can be traced to recognized words or expressions in Standard French or Quebec French; and to establish that the terms are representative of Quebec English usage, by finding evidence of a minimum frequency of use in a variety of texts to eliminate nonce borrowings. Further stages of research will involve analysing, describing, and categorizing occurrences, identifying semantic fields, studying evidence of the degree of loanword assimilation into the grammar of English, and finally, comparing the occurrence of borrowings in the different written genres of our corpus.

RESEARCH QUESTIONS. One research question we face is that of the classification of borrowings. The problem of establishing clear classifications of borrowed items is compounded by the lack of consensus among linguists as to the boundaries between the various levels of language. The French literature on anglicisms offers an abundance of typologies (Colpron 1982, 1994; Darbelnet 1982; Humbley 1974; Pergnier 1989). In our study, we have concentrated on lexical borrowings, an expression which we interpret in the broadest of senses. The most obvious type of borrowing is the outright transfer of a lexical item—a full lexical borrowing. Such terms include single words such as *dépanneur* (convenience store), *poutine* (french fries with cheese and gravy), and *seigneurie* (a tract of land originally granted by the King of France); acronyms and initialisms such as *cegep* (a type of college) and *CLSC* (a community service centre); and collocations such as *vieille souche* and *pure laine* (two terms used to designate French Quebecers of 'old stock'), *cabane à sucre* (sugar shanty) and *boîte à chansons*. Semantic extension is also common, wherein the meaning of an existing form in the host language extends to encompass the meaning of a similar foreign form. To identify and describe such semantic extensions is complex. As Fee (1995) points out, in some cases low frequency English words may be found in relatively common use in Quebec English 'because of the existence of a high-frequency cognate in French (4)'; examples include words such as *fête, collectivity,* and *population.* Such use is distinct from the use of *faux-amis* or false cognates—for example the use of *reunion* for meeting or *library* for bookstore—where acceptability is highly questionable and the meaning of the borrowing clashes with the accepted meaning of an existing host language term.

We also have found numerous loan translations as well as interesting uses of translated elements; examples include the expression *a steamé all-dressed* for a hotdog with the works, part of which is an anglicism (*steamé*) borrowed back into English, and the expression *welcome tax,* a municipal tax on home purchases informally named after provincial minister Bienvenue, who instituted it and whose name it bears, even in translation.

We have excluded most proper nouns, unless these appear pertinent. For example, French proper names of institutions or organizations that also have English designations have been retained as examples of the Quebec English tendency to use French institutional and organizational names even when English terms exist (for example, the use of the term *SQ* or *Sureté du Québec* for the Quebec Police Force). Also, terms such as *caisse* (for credit union) and *régie* (for a government agency) which are usually part of proper names are sometimes used as shortened forms to refer to institutions and even occur as generic terms in English texts. We have also noted usages of proper nouns which have undergone transformation once borrowed into English, such as *Radio-Canada,* the French term for the Canadian Broadcasting Corporation, being clipped to *Rad-Can.*

And, complementary to our study of borrowings, we are also noting items which may not be borrowed from French but are nevertheless distinctive to Quebec English. Such words as *language police* and *tongue trooper* reflect features of Quebec society and are part of the Quebec English lexicon although not borrowed from French.

A number of other parameters can be used to describe borrowings. For example, a loanword may fill a gap, designating some novel concept for which the host language has no term, or it may replace an existing word in the host language. Use of a loanword may be specific to Quebec or may have extended outside Quebec with reference to Quebec (for example, the word *allophone,* although found in Canadian political discourse, refers to the Quebec context). A loanword may be a 'gallicism', taken from Standard French, or a 'Quebecism', reflecting Quebec French usage. All of these features contribute to the complete description of a lexical borrowing.

FINDINGS. Our findings are at this point preliminary. Some of our observations are particular to the language communities under study; others are pertinent to universal theories of languages in contact.

The vast majority of single lexical items we have identified are nouns, with a small incidence of verbs and adjectives. This is entirely in keeping with the hierarchy of 'borrowability' suggested by various linguists, including Weinreich (1953) and Haugen (1950). However, as mentioned earlier, we also are studying larger items such as compounds and collocations.

Our findings reflect varying degrees of assimilation of borrowings into the host language. The assimilation sometimes goes through stages; the degree of integration of the items we have identified varies. Incomplete integration is signalled in written text in a variety of ways. Typographical and mechanical features of the donor language may be retained, for example in the form of accents on words such as *Québécois* and *dépanneur*. The spelling of the borrowing may change to reflect host language usage as the item becomes more integrated; for example, both *francisation* and *francization* have been observed. The lexical unit may be set off by distinct typographical marks such as quotation marks, italics, or bold print. According to our findings to date, the use of typographical features appears to be inconsistent. For example, in the same newspaper the word *dépanneur* appears in one article with the accent and in another article, without. Similarly, in one annual report, the name of a Quebec government ministry appears, apparently arbitrarily, in bold, in italics, and in unmarked form. This lack of consistency throws into question the significance of such typographical features.

Metalinguistic commentary or explanation of a term may appear in parentheses, in apposition, or in other forms. For example, in the Quebec City *Chronicle Telegraph* there is reference to '...a full-time program in French second language for allophones (immigrants)'. Similarly, in *Maclean's*, a national Canadian magazine, in an article about Quebec politics, reference is made to '...allophones (those whose mother tongue is neither French nor English)...' An article in *The Gazette* makes metalinguistic commentary when it writes of '...the allophones, that dreadful word for Montreal's immigrant community'.

Indications of more complete integration include a change of grammatical category, formation of other forms through clipping or other processes (*dep* for *dépanneur, anglos* for *anglophones*), and formation of compounds and expressions in which words, once borrowed, are used in typically English patterns: for example, *cegep student* (rather than *cegepien* as in French) and *calèche-driver* (a *calèche* being a one-horse carriage).

THE SEMANTIC DISTRIBUTION OF LOANWORDS. By grouping the loanwords found in our corpus into rough semantic fields, we have observed that certain semantic fields contain concentrations of borrowings. In Quebec English, apart from concentrations in social, cultural, culinary, and recreational fields, one finds a heavy concentration of loanwords in the field of language and politics. Words and expressions such as *vieille souche, pure laine, allophone, the OLF, francization policies, francophonization, sovereignist,* and *indépendantiste* are high-frequency occurrences, particularly in the press. Fee observes:

> The set of words that has been integrated most thoroughly into Quebec English and even beyond into Canadian and world English is the set of words that deals with Quebec politics, especially linguistic politics. Because much of the debate over these issues has been carried out in the national media and by some of the most important public figures in the country, the words used are quickly disseminated and integrated into the domain of Canadian political discourse. These borrowings are signs of cultural redefinition and the linguistic reconstruction of reality, just as are the new words associated with feminism and anti-racism. These words have a perceptible effect on the relationships in related words in the existing vocabulary because they are sites of struggle for power and are deployed in different ways by different people depending on their sociopolitical context and roles. (1991:17)

This area of inquiry promises to be most fruitful and indicative of relationships of power, prestige and influence between the language groups in contact. What is particularly interesting about this point is that it appears to contrast significantly with the semantic fields of borrowings from English into French in Quebec. The fields of automobile technology, high technology, and business and finance are areas with high concentrations of anglicisms in Quebec French. We have not yet empirically explored the differences between the semantic fields of borrowings in the two languages, but the question invites further research.

DIFFERENCES BETWEEN GENRES. A final objective is to explore the differences between frequency of use and between patterns of use of loanwords in different written genres. This is obviously an ambitious undertaking that will be pursued in greater depth in the later stages of our research. No concrete data has been collected as of yet. However, a preliminary reading of much of the paper corpus indicates that some of the publications of English-rights groups appear to avoid borrowings from French. In particular, one such organization uses the modifiers *English-speaking* and *English-language* to the exclusion of the commonly accepted *anglophone.* This apparent avoidance of an established loanword suggests an attitude of resistance to French-language influence.

CONCLUSION. Although our findings to date are preliminary, our research promises to produce significant insight into contacts between French and English in Quebec. Work in the field confirms that borrowing from French in Quebec English has increased with the changing sociopolitical dynamics of the province. Palmer and Harris's diachronic study (1990) reveals a 'parallel between changing status and increased influence' of French on the English language as it is used in Montreal. As Bouchard notes, 'les peuples ont tendance à emprunter des mots et des expressions aux langues des sociétés dominantes et fortes au plan politique, économique et culturel' (1989:68). It would appear that, with the increasing dominance of French in Quebec society, Quebec English offers fertile ground for linguistic research into contact phenomena.

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A LACK OF ALIEN VERBS: COINAGE IN SCIENCE FICTION

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1. INTRODUCTION. Neologism is a particularly robust phenomenon in Modern English; lexicographers spend substantial amounts of time deciding which words among the plethora appearing each year should be included in new dictionary editions. For the most part, however, these neologisms are not completely new; they are formed from morphemes already extant in established English words. For example, although *internet* is a term of comparatively recent origin, its component parts are not. It is, in fact, rare to find 'pure' neologisms in mainstream English. This poses certain problems for those studying word-formation: standard English coinages do provide information on a speaker's implicit or explicit command of morphological devices, but it can be argued that the speaker's creativity is circumscribed because s/he is constrained by the number and structure of morphemes already in use. 'Pure' neologisms are thus of great interest, since they might provide insights about what happens when speakers creatively try to 'get outside their own language'.

One area in which such coinages occur with some frequency is that of science fiction writing. Authors in this genre commonly invent entire cultures (and species) in their works, and as these are intended to be perceived as new and strange, there is a natural benefit to creating new and strange words to go with them. If a futuristic and/or alien culture is to be seen as truly different from our own, there must be phenomena in it that are different from those we are familiar with, and words for those phenomena. Using more traditional methods of neologism—combining Greek and Latin roots and affixes—allows one to create novel *juxtapositions* of familiar semantic fields, but this is not always sufficient to establish the sense of strangeness/exoticism the author desires. The meaning of pure neologisms can be determined much more actively by the writer, making them a valuable device.

Previous analyses of the use of language in science fiction, such as Barnes (1974) and Meyer (1980), have focused on broad issues: the degree to which authors' linguistic theories seem to match those of linguists, the ways in which authors have their characters go about dealing with language learning in first-contact situations, or the extent to which authors elaborate their novel languages. For the most part, these researchers have been interested in science fiction works which *explicitly* deal with language, in the sense of being about language in some way or involving extended discussions of it (e.g., Samuel R. Delaney's *Babel-17* or Jack Vance's *The Languages of Pao*, both of which address the Sapir-Whorf hypothesis to some extent). There has been little attention paid, however, to the structure of particular authors' *inventories* of neologisms; that is, previous work has been concerned with what authors do with their words, not the words themselves. Barnes and Meyer were doing ground-breaking work; little scholarly attention had been paid to the juxtaposition of science fiction and linguistics at all, and there was a compelling need for 'overview' works.

This paper will present the results of a pilot study in which neologism-inventories were collected from a number of works and then analyzed to determine if patterns existed which would suggest avenues for further study. Section 1 will describe the design of the study and the analytical problems that occurred during it. Section 2 will present the results of the study and point out some patterns within those results, while section 3 will attempt to provide explanations for some of those patterns. The most striking pattern in the results was the greater frequency of nouns over every other syntactic type.

1. DESIGN.

1.1 OVERVIEW. As this was a pilot study, the goal was simply to collect a set of reasonably representative data upon which to base some observations that might inform further work. A total of ten works were used for the primary data sample, with some authors being represented more than once, for comparison (Table 1, below; index codes are provided for the table of results in the appendix). Choice of works was not random; I selected a set which, based on prior experience, I knew contained at least some pure neologisms. In addition, I deliberately included authors whom I considered representative of a range of facility with the coinage process (e.g., it is apparent, even on a rapid reading, that Jo Clayton uses large numbers of neologisms while K. D. Wentworth does not). I selected works which dealt with interaction among a number of species/cultural groups and/or set in periods sufficiently remote from the present to render English an unlikely common tongue, as these elements are most likely to favor pure neologism. Nine of the works were novels; Vance's lengthy short story 'The Last Castle' was added because, based on a reference in Meyer (1980), I had reason to believe it would contain a variety of syntactic types of neologism. I avoided works which involved linguistics itself as a major theme.

After selecting the set of works to evaluate, I scanned them for pure neologisms, counting types but not tokens, and initially included a number of 'borderline' cases discussed below. In three cases (*Dune*, *Golden Witchbreed*, and *Invader*), the authors themselves provided glossaries. The inventories were

Author	**Title**	**Index**	**Date**
Cherryh, C. J.	*Pride of Chanur*	CH1	1981
	Invader	CH2	1995
Clayton, Jo	*Skeen's Leap*	CL1	1986
	Shadowspeer	CL2	1990
Gentle, Mary	*Golden Witchbreed*	GE1	1983
Herbert, Frank	*Dune*	HR1	1965
Vance, Jack	*Trullion*	VA1	1973
	'The Last Castle'	VA2	1966
Wentworth, K. D.	*Moonspeaker*	WE1	1994
	House of Moons	WE2	1995

Table 1. Authors, titles, index codes and dates of works cited

then 'weeded' and organized into a set of broad categories which are descriptively useful, although in need of more precise treatment in further study. Nouns were divided into terms for sophonts (species names), animals, plants, items, social identities or relationships, and abstract concepts.[1] Proper names of individuals and places were not counted. Adjectives, verbs, and interjections were separate categories (no neologistic adverbs or prepositions were found, unsurprisingly) but were not further subdivided. A cross-cutting category of Invective was added due to the number of both nouns and interjections used invectively or derogatorily.

1.2 PROBLEMS OF ANALYSIS. A number of analytical problems were encountered in this study. First, it was sometimes difficult to determine whether an unusual word constituted a pure neologism. Some science fiction authors are wont to mine the more remote recesses of the OED for little-known words; Jack Vance, for example, is one of the few English-speakers for whom *glaucous* and *fulvous* are basic color adjectives. Whether or not a word was really English could, of course, be checked via a dictionary, but there were a number of examples that suggested extant sources but were not identical to them. For example, Jo Clayton (*Skeen's Leap*) introduces a humanoid species, the Naggamar, who have certain reptilian characteristics. It is difficult to determine if this is a conscious allusion to the Naga, or snake-people, of Hindu mythology. Likewise, Frank Herbert directly borrowed a number of words from Arabic in *Dune*; some others of his terms may be 'altered' Arabic that, given my lack of skill in the language, I could not recognize.[2] Meyer (1980:6) cites an example of one of Herbert's later books containing a Sanskrit compound. If the connection between a neologism and an extant word seemed indirect, as with Clayton's Naggamar, I included it in the sample; I attempted to exclude all direct borrowings but may have failed in certain cases, particularly with *Dune*.

The second problem involved the issue of how to deal with groups of related words. Some of the authors, particularly Clayton and Cherryh, create their own micro-systems of affixational morphology. For example, in *Pride of Chanur*, a *mahe* is an individual member of a particular alien species; *mahen* acts as a aggregate or group plural, while *mahendo'sat* appears to denote the species as a social construct (e.g., person vs. people vs. Humanity). The question is whether one should count morphemes or words in such cases. On the one hand, in other cases I counted types, not tokens, and it can be argued that both *mahe* and *mahen* contain the same type. On the other hand, such micro-systems were rarely consistent on a more general level in the data examined; in the same work, one *kif* plus one *kif* equalled two *kif*, not two *kiffen*. For purposes of this study, I (rather arbitrarily) counted types in terms of words, not morphemes, so *mahe* and *mahen* are separate items.

The third problem was one of determining word function and meaning. In most cases, the authors provided sufficient information, either via direct glossing by a character or the narrator, or via sentential context, to establish an approximate word meaning. Clayton, for example, includes phrases such as 'I don't give a ghibb who you are!' (1990:78) in which the general syntactic category and meaning are identifiable—we may not know exactly what a *ghibb* is, but we know it is a noun and it is not pleasant. Still, in this example it is unclear whether to count *ghibb* as an animal, an item, etc. In such cases, the word was counted as a noun but not further categorized. Some examples, however, could simply not be analyzed within the primary categories used; these were counted in an 'other' category. Honorifics constituted another category problem, in that such words can frequently act as nouns or adjectives, with the base class difficult to establish. For purposes of this study, honorifics were counted as adjectives.

Finally, there is the issue of what to do with blends—combinations of a neologistic morpheme with a nonneologistic one. Clayton (1990), for example describes *stinrats* and *zasrats* in terms that make it clear that they are verminous animals; it is logical to suspect that the *-rat* portion of each word is the familiar English term. Again, if one were counting morpheme types this would not be a problem, but I counted word types. Somewhat arbitrarily, again, I counted blends as full neologisms.

2. RESULTS. Appendix 1 presents the overall count of items per category per work. Since some authors were represented by more than one work, and the works varied in length, the raw counts can be misleading. The two Wentworth works, for example, are closely related, both in plot and time of

publication, so that the inventories of the two overlap a great deal. One of the Vance works is a short story; it would be unsurprising to discover that fewer neologisms occur in a short work than a long one. For comparison, some kind of 'normalized' count is needed. I used the total number of items in each category for each author, divided by the total number of pages for that author, multiplied by 1000; results are presented in Table 2 below. Obviously, dividing by number of words would have been preferable, but counting pages was the only feasible option. The resulting values are a rough approximate of number of neologisms in each category per 1000 pages, but since the combined page totals for each author were all under 600 pages, the values should not be regarded as statistically rigorous.

As the normalized counts show, by far the strongest pattern in the results is the prevalence of nouns over other syntactic types: 89% of the total inventory of neologisms comprised nouns. Adjectives were the second most common type, but most of the items counted as adjectives were, in fact, honorifics, which could be used nominally as well. Of the few nonhonorifics, most were derogatory to a greater or lesser degree. It thus appears that neologistic adjectives in science fiction tend to be tied to social valuations, either positive or negative. Verbs were quite rare and in several examples are introduced as invective; Clayton's use of *jogga* in *Shadowspeer* is precisely analogous to *fuck* (the derivative epithetic noun *mommajogga* is used as well). Jack Vance's *Last Castle* included two noninvective verbs (a verb of motion and a verb of cognition) and C. J. Cherryh's *Invader* included a verb of mental condition that might also be analyzed as an adjective ('refusing to be shaken'). Within the general noun category, there was wide variation; from the sample, it cannot be claimed that terms for animals are generally more numerous than terms for plants, etc.

As might be expected, a large amount of variation was observed among the authors. Both Clayton's *Skeen's Leap* and Cherryh's *Pride of Chanur* involve settings in which a number of species regularly interact, so that, all things being equal, one would expect a roughly equal number of neologisms, but such is not the case. Clayton uses far more neologisms than does Cherryh; in fact, Cherryh uses a greater number of neologisms in *Invader*, which involves fewer intelligent species. Some authors did, however, evince certain distinctive neologistic strategies. Clayton creates a profusion of social terms, most of which are political or occupational titles; each culture has a different name for the ruler(s) and often specific names for that culture's variant of a recognizable job category. In *Skeen's Leap*, for example, a group of hired guards of the Chalarosh species that also keep the protagonist under surveillance for the government is known as an 'inlal of klazits', so that there is a specialized group term (*inlal*) as well as an occupation title (*klazit*). Jack Vance creates

	Clayton	Cherryh	Gentle	Herbert	Vance	Went.
N/?	27	0	0	0	8	0
N/Sophont	45	15	0	0	35	7
N/Animal	42	7	33	2	24	30
N/Plant	11	1	21	4	31	10
N/Item	50	6	21	33	35	16
N/Social	101	15	21	22	28	5
N/Abs	20	16	4	35	20	0
Adjectives	17	13	2	2	8	0
Verbs	3	1	0	0	8	0
Interject.	15	1	0	0	0	0
Other	8	3	4	8	0	2
Invective	45	0	0	0	8	3
NounTot.	296	60	100	96	181	68
~NounTot.	42	19	6	10	16	2

Table 2. Normalized results of study.

terms for emotional states or nuances (e.g., *forlostwenna*, approx. 'an urgent desire to travel' < *Trullion*), a category almost absent in other author's works.

There was also a good deal of variation in authors' inclusion of specifically grammatical and/or metalinguistic terminology or operators. Several of the authors provide plurals of terms, although only Cherryh's *Invader* goes so far as to explicitly discuss plurals (in an appendix which presents the Ateva language as being eerily similar to Latin, to the extent of having an ablative case suffix). Gentle's glossary includes a gloss for a diminutive suffix; several authors, including Cherryh and Clayton, created some honorifics as suffixes. Clayton's *Shadowspeer* included one fully metalinguistic term, *shidduah*, referring to a ritual greeting.

3. DISCUSSION. The most striking patterns in the results are (1) the predominance of nouns, (2) the social-valuation characteristics of the adjectives, (3) the frequency of invective usages in some of the authors' works, and (4) the types of variation among authors. I will discuss each of these below, proposing some explanations which should be viewed as quite tentative given the small set of data.

3.1 NOUN PREDOMINANCE. The striking imbalance in syntactic types represented in the data would probably manifest in a wider data sample as well; one reason I conducted this pilot study was that an informal reading of a wide range of science fiction novels had yielded very few non-nominal neologisms. The most famous exception is probably *grok*, from Robert Heinlein's *Stranger in a Strange Land* (1961). As Meyers (1980:31–32) has pointed out, Heinlein's *Stranger* was selected as part of the Brown Corpus, and hence *grok* appeared in dictionaries that used this corpus. Had the Brown Corpus included *Dune* instead, we would have no 'official' alien verbs (but would have a much greater number of official alien drugs and poisons!). Heinlein's *Stranger* is unique in a number of ways and in fact devotes a great deal of prose to defining *grok*; in some ways, the book's major theme can be seen as an extended definition of the term. Most other works do not focus on specific alien terms, let alone verbal ones. Why are there so many nouns and so few non-nouns?

One explanation is that science-fiction authors, consciously or unconsciously, are recapitulating a 'contact borrowing' paradigm. Most obviously borrowed terms in English are nominals, and it would not be surprising if authors reflected this. This explanation, however, seems to avoid the fundamental question, since we could then ask why so many borrowed words are nominals. Why don't speakers borrow more verbs? In addition, one does expect borrowings in cases where one's language has a perfectly usable equivalent; why would Clayton not use 'a group of guards', stipulating that they also spy for the government, rather than 'an inlal of klazits'?

As a second explanation we could argue that it is easier to create novel nominals than novel verbs; that is, less cognitive effort is required on the part of the author to make up nouns. There is some support for this idea from other areas of linguistics. It has long been noted, for example, that nouns enjoy an early advantage in child language development (cf. review in Gentner 1982) and one study demonstrated that children found object-denoting words (which are also nouns) to be easier to pronounce than action-denoting ones (Camarata & Leonard 1986). This has led Spelke and others (Spelke 1985; Spelke, Kestenbaum & von Hofstein 1989) to argue that the discrimination of objects from the environment and the formation of object concepts is 'hard-wired' in infants. Adults, as well, appear to have an easier time learning novel object-denoting words than action-denoting ones (Spinney & Haynes 1989). If ease of learning is related to ease of creation, this would help explain the large number of nominal neologisms.

A third explanation involves the reader, rather than the author. Novel nouns may be less disruptive to the reading process than novel verbs. Works with large numbers of neologisms require more effort of their readers, and authors, one would assume, probably take that into account. James Joyce's *Finnegan's Wake*, with its plethora of neologisms, may have won critical acclaim but is the object of much wailing and gnashing of teeth among English graduate students. Science fiction is a 'popular' genre, where critical acclaim is less important than sales volume; one would have a difficult time continuing to publish if one's only readers were English graduate students (wailing ones at that). However, this explanation can be reduced to the previous one. Why would novel nouns be less disruptive than novel verbs? If the answer is that the nouns require less cognitive 'work', this explanation is the same for both reader and author.

Obviously, the 'cognitive work' explanation is a simplistic one—'work', for example, should be defined in some way, and it is quite possible that different types of 'work', however defined, are involved in what the author does and what the reader does. Its value is that it connects a seemingly isolated observation about neologisms in a literary genre to general cognitive constraints and is, therefore, worthy of further consideration.

3.2 SOCIAL ADJECTIVES AND INVECTIVE. As noted in section 2, most of the adjectives in the sample were honorifics. Given that honorifics are a relatively minuscule proportion of the total number of words in any language, it is curious that so many should be represented here. The reason may lie in the fact that honorifics are among those words whose denotations are less important than the social consequences of their use. In other words, it is not really necessary to *know* what an honorific means, in the formal-semantic sense; it is, instead, important to know when one should use it; its illocutionary force is of primary value. Therefore, while an 'alien honorific' may not have a denotation that an English-speaker is familiar with, it is *functionally* synonymous to words that an English-speaker is familiar with. It is, in effect, simply a different phonological form to associate with an existing conceptual structure, rather than a new conceptual structure.

The same explanation can hold for those adjectives and nouns used as invective: they are functionally identical to invective usages familiar to the readers. Swearing is swearing; one can use some foreign epithets correctly without knowing what they actually mean, and in some cases actually thinking about the meaning of an invective term renders it inappropriate for use. Thus, honorifics and invectives can be considered 'phonetic neologisms' in that the only 'new' aspect of them is their sound.[3]

Some coinages which were neither honorific nor invective appeared to function as phonetic neologisms, in that they were presented in contexts where their denotation seemed subsumed in their formulaic use. Clayton, for example, uses several phrases such as 'soft as the down on a hakkug's belly' (1990:255), in which the actual meaning of the novel term does not have to be recognized, only that it is functioning in a familiar, formulaic comparison structure.

3.3 VARIATION. In a sense, it would be more surprising to find that authors create similar coinages than to find that wide variation exists. What is interesting about the sample studied is the extent of variation between works by the same author. The standard rationale for using neologisms in science fiction is 'verisimilitude'; e.g., aliens would believably have alien words and concepts. We would thus expect *all* science fiction in which aliens appear to make use of extensive neologism (or risk seeming 'unrealistic' within the terms of the suspension-of-disbelief contract). I expected that the number neologisms would be in some way related to the number of interacting alien species (more groups, more neologisms), but as noted, Cherryh's work demonstrates the opposite. The most influential factor may instead be one of intended viewpoint or tone, e.g., the extent to which an author intends the reader to consciously view the presented setting as 'exotic'. In *Pride of Chanur*, Cherryh adopts an unusual device: the sole human in the story is the 'alien' among several species who have been dealing with each other for quite some time. It is told from the aliens' point of view. The lack of neologisms in *Pride* may be related to the fact that to the major protagonists, their own context is not an exotic one; it is everyday life. What neologisms do occur usually pertain to known species other than the protagonists' own.

In the second Cherryh book, *Invader*, on the other hand, the major protagonist is a human who is trying to understand an alien species that is fundamentally different in certain respects, so that the 'exotic' character of the aliens' culture is highlighted. A number of concepts represented by neologisms are given a good deal of textual development, in order to aid the reader in simultaneously understanding the culture but recognizing that it is alien. We can thus identify one type of neologism-use which correlates with what I will term an 'Establishment of Otherness' strategy on the part of the author.

A different type of strategy may be involved in other kinds of neologistic usages, however. As noted, neologistic invective isn't really very 'new'; in particular, it doesn't establish the 'alien' character of the setting. Shouting invective after hitting one's thumb with a hammer isn't exotic at all, even if it was one's fifth thumb that was hit. It does add a certain type of verisimilitude, though. Anyone who has travelled is familiar with settings in which one does not find the surroundings particularly incomprehensible, but in which some of the words are unfamiliar. Adding neologisms to a character's speech in a science fiction novel can serve as part of a 'local color' strategy. This is particularly obvious in Clayton's works; she frequently uses urban settings and characters with underworld connections, and the neologisms in their speech function to indicate street slang. If the reader understood it completely (i.e., if the neologisms were not used), it would not be detectable as slang (unless one wants to have all aliens sound as if they are from Brooklyn, or Los Angeles, etc.).[4] This is a variant, of course, of the general strategy of verisimilitude, but it seems to be one that favors a much greater use of certain *types* of neologism, particularly in the social and animal categories (used invectively).

3.4 DIRECTIONS FOR FURTHER INQUIRY. Obviously, given the small size of the data sample, the most pressing need is for expansion of the research base. There may be quite interesting differences in the use of neologism in science fiction works from different periods, or between works by male vs. female authors, that will be detectable only with a much wider sample set. In addition, patterns within the results will only reach statistical significance if more data are considered. The results so far do indicate that syntactic category of neologism, semantic category of verb and adjective neologisms, and overall frequency of neologism across authors should be considered as potentially important variables. In addition, examination of a work's inventory of neologisms may provide valuable insights into its literary structure and the strategies being used by the author.

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[1] The category 'social' included honorific and occupational titles, kinship terms, and words denoting social groups. 'Abstract' included a rather wide variety of items, including terms for emotions (a Vance speciatly), units of measurement, etc.

[2] I checked items in Herbert's glossary against a standard Arabic dictionary and a dictionary of Islamic theology (many of the potential Arabic words represented theological concepts). Matches were removed from the set of neologisms, even if some semantic change was evident. For example, in Arabic law, *fai* referred to booty collected from countries that did not resist occupation, while *ghanima* referred to booty from countries that did. In *Dune*, *fai* refers to a water tax levied on the inhabitants, and *ghanima* refers to a combat momento. The connection seemed close enough to warrant treating both items as borrowings. Some cases, however, were not so clear. Herbert uses *taqwa* to refer to 'something of great value'; whether this is from the Arabic *tawwaq* 'yearning' is open to question.

[3] One could easily envision exceptions, of course; a science-fiction novel could use an intricate *system* of honorifics, quite unlike the English one, to reveal a different type of social structure, devoting some discussion to the topic of how each honorific functions. This was not the case in the works examined, however.

[4] A major problem with using *real* slang to establish verisimilitude in a science-fiction novel is that slang is inevitably tied to a locational and social context. One cannot use modern street-gang terms from New York without the reader viewing the action as taking place in modern New York. Thus, something is needed that is recognizably nonstandard, but not tied to an actual place or time. Exceptions, of course, occur in works with time-travel plots or which are set in alternate presents; in such cases reals slang establishes verisimiltude directly.

APPENDIX: RAW DATA

	CL1	CL2	CH1	CH2	GE1	HR1	VA1	VA2	WE1	WE2
N/Sophont	4	14	0	0	0	0	1	1	0	0
N/Animal	15	15	9	1	0	0	7	2	1	3
N/Plant	1	6	1	0	10	2	8	0	1	5
N/Item	9	24	1	3	10	17	9	0	6	3
N/Social	31	36	2	8	10	11	7	0	2	1
N/Abstract	7	6	0	11	2	18	5	0	0	0
Adjective	6	5	3	6	1	1	1	1	0	0
Verb	0	2	0	1	0	0	1	2	0	0
Interjection	1	9	1	0	0	0	0	0	0	0
Other	0	5	1	1	2	4	0	0	0	1
Invective	5	25	0	0	0	0	2	0	1	1
Noun Total	85	111	14	27	48	49	43	3	18	21
~Noun Tot.	7	21	5	8	3	5	2	3	0	1
Total	92	132	19	35	51	54	45	6	18	22
Pages	320	342	223	458	478	510	192	62	281	295

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VIII. CROSS-LINGUISTIC STUDIES

CHIAC: THE HYBRID VERNACULAR OF MONCTON ACADIAN TEENAGERS

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INTRODUCTION.* It is held that Chiac, a hybrid vernacular basically French in structure and blended with English, is derived from the word *Shediac*. Chiac is spoken by Acadian teenagers living in the town of Moncton, which is situated in southeast New Brunswick. The teenagers use this linguistic code to symbolize their allegiance to a group of adolescents not comfortable with the standard French norm imposed by the school and who at the same time do not want to associate themselves with the language of old-generation Acadians or with English, the dominant language spoken in Moncton. Speaking Chiac is their way of asserting a specific Acadian identity.

A preliminary study of Chiac was done at Moncton University in 1984. The main findings were that Chiac is formed by the integration of the lexicogrammatical systems of traditional Acadian French, standard French and English, not in free variation, but according to specific rules. Marie-Eve Perrot, a graduate student of the Sorbonne University in Paris, followed up these findings in her doctoral thesis. She hypothesized that traditional Acadian French and English act as interfaces to restructure a standard French matrix into a new linguistic code known as Chiac.

Data for her study were obtained by recording the spontaneous speech of 44 boys and girls from ages 16 to 18 at the Acadian high school in Moncton. Thirteen recordings were retained for analysis. Transcription of the recordings showed that the integration of English ordinals such as first/last into a French matrix was significant. Perrot's analysis of the integration of these ordinals into a standard French matrix confirms the hypothesis that Chiac is a coherent code with specific generalizations. The sample sentences in columns A/B taken from her doctoral thesis, *Aspects Fondamentaux du Métissage: Français/Anglais dans le Chiac de Moncton Nouveau-Brunswick* (1992:114–15), permit a summary of a grammatical analysis whose results show how Acadian teenagers use the English ordinals *last/next.*

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*My sincerest thanks to William Sullivan for his constructive comments on this paper and to Marie-Eve Perrot for letting me use her data.

In column A, the phrase idioms next week/last week are temporal adjuncts in the form of a noun phrase (Quirk 1972:319). In column B according to Perrot (1992:115), the noun phrases *la last année/la next journée* mark order or succession, which in this paper will be termed SPACE.

A	B
—Moi, j'ai ma beginners, je peux aller pour ma license *next week.*	—*La last année* que j'ai joué quand-ce qu'on a commencé on avait un coach qui savait pas vraiment coacher.
—*Last year* en physique, elle était dans ma classe	—Dan, i décollait *la next journée.*

In French, pre/post modification of ordinals may convey different semantic properties. For example *l'année dernière* is marked by the property TIME while *la dernière année* is marked by SPACE. Perrot notes that the substitution of a French ordinal adjective by the English last/next within a French noun structure:

1) simplifies word order in Chiac by always placing the ordinal before a noun:

French:	l'année dernière/la dernière année
Chiac:	last year/ la last année

2) simplifies vocabulary use:

French:	l'année suivante/l'année prochaine
Chiac:	la last année/last year

3) generalizes use of the property TIME is generalized to the borrowed English phrasal idioms *last year/next year,* while the property SPACE is generalized to hybrid formations such as *la last année/la next journée.*

Perrot's analysis of how an English ordinal interface is integrated into a French matrix is essentially a morphosyntactic distributional analysis which does not take into account connections to the semantic or conceptual level.

PURPOSE. The purpose of this paper is to investigate how the English ordinals *last/next* are interconnected at the conceptual level of Chiac speakers.

DATA-METHOD: Sample Chiac sentences with English and standard French equivalents taken from Marie-Eve Perrot's thesis are analyzed according to Sydney Lamb's (1995) current cognitive network model.

ANALYSIS: Lamb's 1971 cognitive relational model was based exclusively on linguistic evidence. Production and comprehension of language was represented as a bidirectional process which could be accounted for with two-way lines and nodes or by interconnecting networks: one for reception, one for production. His 1995 model incorporates the latest findings in neurobiology in which linguistic concepts are related to neural processes (Burnod 1990).

A relational network model allows parallel processing of linguistic information via hierarchically organized structures. On a local level, the most important processing function is activation of nodes in the network via the transmission of excitatory or inhibitory signals from one location to another. Nodes in the network determine how much activation has been received and send out an according amount of activation to nodes to which it is related. This function involves the summation of the frequencies of incoming pulses (Lamb 1995:11–14; Burnod 1990:1–2). Information processing in the brain is more than simple association and substitution. It is an active structured process which involves transmission of activation along connections of a neural network so structured that the information is in the connectivity of the network (Lamb 1995:5; Burnod 1990:4).

Current neurobiological studies show that the production and comprehension of language is a function of the interactions between the different cortical areas of the brain and the cellular organization of the cerebral cortex at different higher levels. The function of cellular interactions as described by Burnod supports Lamb's updated tenet of how bidirectional processing operates in learning. Lamb (1995:20) holds that the basic learning process is a recursive strengthening of connections and raising of activation thresholds. This process depends on both external and internal stimulation. Repeated external stimulation serves to strengthen connections and raise thresholds, while repeated internal stimulation not only sends activation to the next higher level of integration but also to the next lower level. The downward activation needs to be strong enough to reactivate the currently active nections on the adjacent level while not activating others on that level. In this way, any new set of connections is repeatedly activated and in time is established as a new neural network. This bidirectional processing, as described by Lamb, also provides a means of accounting for the processing of the semantic interpretations and lexical realizations of the English ordinals last/next by Acadian teenagers speaking Chiac. An example of this is shown in Figure 1, in which the activation of lines is sent not only to the next higher level of integration, but also to a lower level to establish a Chiac neural network. The notations of

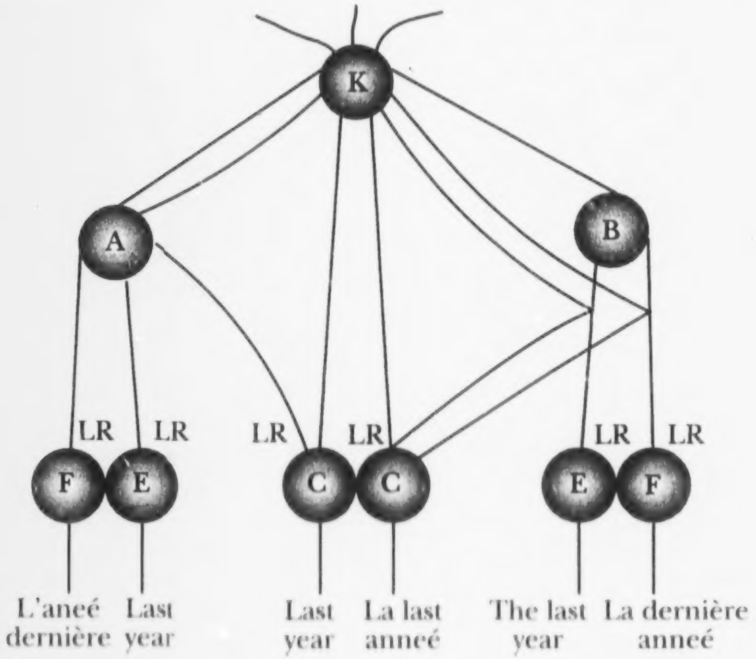

Figure 1. Activation of new lines in the foundation of a Chiac neural network.

Lamb's current model can recruit latent nections for new functions and add new connections to existing nections by raising the strength of the nections to a higher level. Figure 1 shows that the model can account for the formation of Chiac by Acadian teenagers.

In Figure 1, upward lines are straight, downward lines are curved. Nection A represents the property TIME, B the property SPACE, and K represents a combination of the two properties as a unit. LRF, LRE, LRC represent French, English, and Chiac noun phrases.

Nections A, B and K function as pyramidal neurons with the potential for higher and lower-level integration. Nection K is an integration structure. It allows the properties of TIME and SPACE to be apprehended as a *unit.* It also activates lines to the lower-level nections A/B, each of which represents a specific property. New lines from nections A/B are activated until Chiac nections are established. These in turn are realized as the lexical units *last year* and *la last année.*

DISCUSSION. Perrot's analysis of the integration of *last/next* into a French matrix confirms the hypothesis that Chiac is a coherent linguistic code characterized by generalizations. However, it is to be noted that grammatically, while in standard French it is the pre/post modification of the French ordinal *dernier* which determines the meaning difference of the noun phrases *l'année dernière/la dernière année*, this is not so in English. The determiner *the* in English differentiates the meaning between *last week* and *the last week*.

Perrot holds that the English ordinal *last* by replacing the French ordinal adjective *dernière* serves to keep intact both the meaning and the French grammatical structure of the phrase *la last année* and that in French, the adjective as a part of speech, is a label the word order of which explains how the teenagers perceive ordinance. In reality, parts of speech are labels referring to parts of thought which are not directly observable. It is a cognitive analysis such as Sydney Lamb's which is capable of showing that the French ordinal adjective and the adverbial use of the English ordinals *last/next* both refer to the same mental concept. The teenagers, perceiving this fact, were then able to blend the English ordinals coherently into Chiac noun phrases to convey the message of space or *ordinance*.

CONCLUSION. Marie-Eve Perrot's grammatical analysis of how Acadian teenagers use the English *last/next* in Chiac has provided a very good take-off base for a cognitive analysis of the same data. Results of the cognitive analysis show that the information system of the Acadian teenagers is richly endowed with coherent neural structures which permit them to produce the semantic and lexical components of Chiac. In doing so, the analysis shows that Lamb's current network model correlates well with recent studies in neurobiology, and it can account for linguistic data commanded by speakers of French, English and Chiac.

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ERRORS WITH INFLECTIONAL MORPHEMES IN THE ENGLISH COMPOSITIONS OF LEP STUDENTS

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INTRODUCTION. Research on errors with the English inflectional morphemes in writing by both native speakers and by ESL students has yielded some consistent findings. The first consistent finding is that when learners make errors with the inflectional morphemes, they are almost exclusively errors of omission; rather than attaching an inflectional morpheme to a stem that does not require one, learners sometimes fail to attach inflectional morphemes to an appropriate stem under obligatory contexts. In addition, learners generally do not substitute an incorrect inflectional morpheme for a correct one; for example, learners rarely suffix a progressive morpheme to a stem requiring a perfect morpheme. This generalization is true in the writing of native English-speaking children in the elementary grades (Cronnell 1984; Smith-Lock 1991) and in middle grades (Whiteman 1981), for native English-speaking adults (House & House 1980) and for both child and adult ESL students (Cronnell 1982; Carlisle & McKenna 1991).

The second generalization from these studies is that the frequency of deletion of inflectional morphemes correlates with language proficiency, especially literacy, more proficient writers deleting fewer inflectional morphemes than do less proficient writers. For example, Smith-Lock (1991) examined the plural morpheme and the third person singular morpheme in a writing task administered to 29 native English-speaking second graders who were divided into a normal reading group and poor reading group as determined by a standardized reading test. The good reading group averaged significantly fewer deletions than did the poor. In another study of native English speakers of different proficiencies, House and House (1980) examined plural, possessive, third person singular, and past tense morphemes in the writing of students in regular composition and two levels of remedial composition in a community college. The lowest proficiency writing group was clearly distinguished from the other two groups in that the students in it deleted the past tense, plural, and third person singular morphemes significantly more frequently; no difference was observed on the possessive morpheme which occurred infrequently in the corpus of data.

Some evidence also exists that young non-native English speakers delete inflectional morphemes more frequently than do native English speakers when age and grade are held constant. Gilbert and Grabe (1991) conducted a study of the writing of 101 fifth graders from three different language backgrounds: English, Navajo, and Spanish. Results indicated that the non-native English-speaking groups made significantly more errors in verb and noun morphology than did the native English speakers. Given the assumption that young non-native speakers of English are less proficient writers than are native speakers when such factors as age and grade are held constant, then this study supports the generalization that errors with inflectional morphemes correlate with language proficiency.

As rich as the research has been on inflectional morphemes in writing, many assumptions and questions remain to be addressed. One assumption is that ESL students drop inflectional morphemes frequently in their writing. In an early work on error, Burt and Kiparsky (1972) compiled a compendium of common grammatical errors in both the oral and written production of ESL students and essentially acknowledged that errors with the inflectional morphemes were commonly committed by ESL students. In a more recent article examining the plural morpheme, Mellow and Cumming (1994) partially justified their research with the unsupported claim that 'errors with these elements are common among language learners' (443).[1] And Eubank (1994) in a study of the third person singular morpheme, asserts that 'as nearly any teacher of ESL can verify, the third person singular agreement affix /-s/... is a late acquired item, resisting pedagogical efforts to the contrary' (84). In spite of claims such as these, next to nothing is known about the frequency with which ESL students delete inflectional morphemes. There seems to be a number of reasons for this. First of all, not a single study exists, as far as we know, which has examined the eight traditionally recognized inflectional morphemes as a unified grammatical category. Studies may examine one or two morphemes at a time as has been true of just about every study mentioned in this review up to this point, and the studies that may have taken all eight morphemes into account did not just examine inflectional morphemes. For example, Carlisle and McKenna (1991) compared the frequency of errors committed by native English speakers and native Spanish speakers in remedial English composition classes, and whereas the deletion of inflectional morphemes was one category of error, no attempt was made to determine what percentage of inflectional morphemes was deleted. A true estimate of deletion can be obtained by calculating the number of deletions over the sum of the actual and potential occurrences for each inflectional morpheme under investigation. Only a few studies contain such calculations, and none of those examined all of the inflectional morphemes (Whiteman 1981; Ellis 1987).

The second problem is related to the first. If researchers do not have an accurate account of how frequently non-native speakers delete inflectional morphemes, they do not have accurate comparative information with native English speakers who are still developing writers. Without such comparative information, it is impossible to judge how serious deletions are by non-native English speakers. As far as we know, only one study exists comparing the deletion of inflectional morphemes by native speakers of English and those of other languages (Gilbert & Grabe 1991). However, that study examined only three inflectional morphemes, and, as will be discussed below, their classification of errors allowed them to include deletions with other types of errors under the same error category.

A third problem with the studies of inflectional morphemes is one of definition. Oftentimes errors resulting from the deletion of inflectional morphemes may be grouped together with other types of errors. For example, Gilbert and Grabe (1991) investigated four types of errors in their study, three of which are pertinent for the current study: subject-verb agreement, verb morphology errors, and noun morphology errors. Each of those error types could be the result of the deletion of an inflectional morpheme, and the researchers provided explicit examples of those deletions. However, they also included other examples demonstrating that other occurrences could lead to the same broadly defined error type. For example, *'They was running' was classified as an agreement error, and *'Why did you threw the ball?' was classified as a verbal morphology error. Our use of these examples is not meant to suggest that the original researchers were somehow incorrect in their classifications. After all, their study was not explicitly about the deletion of inflectional morphemes; rather they were examining patterns of errors across groups. This review of their study merely demonstrates that disparate types of errors can be classified into a larger category depending upon the intent of the researchers. The problem can be easily resolved by examining the inflectional morphemes as a unified linguistic category and by examining just errors of omission.

2. PURPOSE. The purpose of the current study is to compare the frequency of the deletion of inflectional morphemes in the writing of native English speakers and non-native English speakers. This study is unique in that it specifically analyzes the deletion of all eight inflectional morphemes as a unified grammatical category[2] and produces an exact percentage of deletion for each.

3. HYPOTHESES. Based on specific findings from the review of literature, the current study examines two non-null hypotheses:

(1) Native Spanish speakers in the fourth grade will delete a significantly greater percentage of inflectional morphemes in writing than will native English speakers in the same grade.

(2) Native Spanish speakers in the sixth grade will delete a significantly greater percentage of inflectional morphemes in writing than will native English speakers in the same grade.

4. METHODOLOGY.

4.1. SUBJECTS. The subjects for this study consisted of 62 native English-speaking and Spanish-speaking fourth and sixth graders attending a large school district located in an urbanized area west of Chicago. Out of the approximately 25,500 students this district serves, about 4,500 come from homes where English is not the language of daily discourse. The 9 native English-speaking fourth graders and the 11 native English-speaking sixth graders participating in the study were randomly selected from a single school located in a neighborhood with a large Spanish-speaking population. Selection was done in this manner in an attempt to control for possible differences in socio-economic status, a variable that correlates strongly with academic achievement.

The native Spanish speakers consisted of 23 fourth graders and 19 sixth graders who had been identified as limited English proficient by testing procedures in the school district. However, a random selection of the Spanish-speaking subjects was not possible because of the difficulty in finding a sufficient number of Spanish-speaking subjects in any one school. Approximately half of the native Spanish speakers were in a submersion program. In this program, all of the classes were conducted in English and the students never received any instruction to develop literacy skills in their L1. The other half of the native Spanish speakers consisted of students who had been enrolled in a bilingual program for at least two years. At the time of data gathering some of the fourth graders were still enrolled in the bilingual program, but all of the sixth graders had been out of the program for at least one year and were now enrolled in the regular curriculum of the school district. Unlike the Spanish speakers in the submersion program those who had participated in the bilingual program were literate in their L1. This was confirmed by having them write two essays in Spanish. However, in spite of the native Spanish speakers coming from two different programs, they did not exhibit a significant difference on the variable being examined, and the submersion and bilingual subjects in the fourth grade were treated as one group, and those in the sixth grade were treated as another.[3]

Finally, none of the subjects—neither the native English speakers or the native Spanish speakers—had ever required or received learning disability services.

Before the elicitation of the data began, the parents of all subjects gave permission for their children to participate, and the students were informed that they would be participating in a study.

4.2. GATHERING THE DATA. Each subject completed seven writing tasks in English developed by the National Assessment of Educational Progress (NAEP) and used for that organization's research (1980a, 1980b). Each of these writing tasks comes with explicit instructions in English directing the students on what to write. For example, the 'Rainy Day' task asks the students to describe how a rainy school morning makes them feel. 'Loss' requires the subjects to tell about something or someone that they have lost and how they feel about that loss. 'Fireflies' has a picture of a young girl playing outside and attempting to catch some fireflies; the subject is asked to tell about what the girl is doing and what she might do next. The 'Puppy Letter' requires students to write a persuasive letter to a new landlord in an attempt to convince him or her to let a puppy live in the writer's apartment. The 'Letter to Principal' asks the students to write a suggestion to the school principal on how to improve a particular aspect of the school.

The subjects wrote under similar circumstances and were given the same amount of time to write, approximately fifteen minutes for each essay as stipulated by NAEP guidelines.

4.3. ANALYZING THE DATA. Because the 62 subjects each wrote seven essays in English, the researchers analyzed a total of 434 compositions. Each composition was separated into T-Units, and each T-Unit was systematically examined for both actual occurrences of inflectional morphemes and those deleted from an obligatory context. All deletions of inflectional morphemes as well as their correct occurrences were marked on the essays and then tallied on individual scoring sheets. These totals, which were generated for each individual essay, allowed the researchers to calculate percentages for the frequency of deletion of each of the inflectional morphemes for each subject. Percentages were calculated as the number of deletions over the number of occurrences in both obligatory and nonobligatory contexts and deletions.

4.3.1. ITEMS COUNTED AS DELETIONS OF INFLECTIONAL MORPHEMES. The following are examples of actual data to demonstrate typical instances which the researchers counted as deletions of inflectional morphemes in obligatory contexts, and we provide an explanation of the obligatory context which led us to the conclusion that an inflectional morpheme had been deleted. Examples of the comparative and the superlative are not included because we did not find any instances of their deletion; neither do we include the possessive as we detected only two deletions in the entire corpus of data. Note that the examples are shown as they were written by the subjects and include all mistakes such as incorrect spellings and punctuation. The underlined word is the one which requires the inflectional morpheme and anything appearing in brackets has been added to clarify the subject's original meaning.

4.3.1.1. *Plural*:

Subject 27: I have 2 *brother* 1 sister and a mother and a father

In the example above, the numeral, 2, is a concording element to which the noun, *brother*, must agree in number.

4.3.1.2. *Third Person Singular Present*:

Subject 18: His mother comes back and *say* shes hungry too

This example contains two conjoined verbs. The first, *comes*, is in the present tense and agrees with its third person singular subject. In such a conjoined structure, the second verb must also agree with the grammatical subject.

4.3.1.3. *Past Tense*:

Subject 17: He *jump* out of the bush and hopped tord the fence

This example is similar to the one for the third person singular. The sentence consists of a conjoined predicate. For the sentence to be grammatical, both verbs must agree in tense. In addition, the researchers were sure that the past tense morpheme had been deleted because the surrounding T-Units had adverbials of past time in them.

4.3.1.4. *Perfect*:

Subject 34: Maybe he was being *chase* from some zoo hunters

The auxiliary construction, *was being*, demands a main verb with the perfect inflectional morpheme.

4.3.1.5. *Progressive:*

Subject 48: He was *run* and jumping

This is another example of a conjoined structure. The auxiliary, *was*, could be followed by a main verb with either the perfect or progressive inflectional morpheme. As *jumping* is in the progressive form, *run* must occur in an identical form.

4.3.2. ITEMS NOT COUNTED AS DELETIONS OF INFLECTIONAL MORPHEMES. This study considered only regular inflectional forms: No irregular verb or noun forms were included in the data. For example, one composition was found to contain the following T-Unit:

> Subject 21: when some bary [somebody] found it it was *brok*

Even though *broke* obviously needed to be in past participle form, the deletion of *-en* was not marked as a deletion as it is an irregular verb form.

Another type of error not counted as a deletion was what we called 'errors of ambiguous source', errors that could be repaired in more than one way, one of which could be the attachment of an inflectional morpheme. The following is an example of this type of error of ambiguous source:

> Subject 55: and I don't like when is raining because people have to take *umbrella*

This problem with the noun *umbrella* can be repaired in two different manners. First, the problem can be corrected with the suffixing of the plural inflectional morpheme. Second, an article can be inserted (e.g., an umbrella), preempting the need for suffixing. Notice that whereas the sentence can be repaired in two ways, no real ambiguity of meaning exists. Either umbrella is pluralized specifically meaning that each person has an umbrella, or umbrella can be preceded by an article indicating that the noun is to understood in a generic sense. A more serious example of error of ambiguous source is provided in the following example:

> Subject 37: I've got pictures of cars, *truck*, *3 wheeler* and much more

Again, the italicized nouns could be corrected in more than one way. They could either be corrected by the insertion of articles (e.g., a truck and a 3 wheeler), or corrected with the suffixing of the plural inflectional morphemes on *truck* and *3 wheeler*. This example demonstrates a clear ambiguity in meaning. The child writer has not informed the writer if he has just one poster of each or more than one of each. Yet another interpretation is that he has a single poster of one and more than one poster of the other. Fortunately,

Type	Number of Occurrences	Percentage of Occurrence
Plural	1298	45.3
Past Tense	532	18.5
Progressive	505	17.6
Third Person	33	11.5
Possessive	74	2.6
Comparative	40	1.4
Superlative	19	.7
Totals	**1868**	**100.0**

Table 1. Totals of actual and potential occurences of inflectional morphemes

occurrences of error of ambiguous sources were exceptionally rare in the data, numbering only ten.

4.4. RELIABILITY. Two members of the research team received copies of all the essays written in English. Only the T-unit boundaries had been previously marked. These two researchers then independently marked all of the actual and potential morphemes. Their results were then compared and any differences were reconciled by the entire team. The disagreements between the two readers usually consisted of one reader not marking an occurrence of a morpheme or accidentally marking an irregular form. Initial agreement between the two team members was .97 for both actual and potential occurrences of the morphemes. All disagreements between the raters were resolved.

4.5. STATISTICAL ANALYSIS. To examine differences in frequency in the deletion of inflectional morphemes between language groups in both the fourth and sixth grades, the research team calculated two *t* tests.

5. RESULTS. The essays written by the subjects contained 2681 actual occurrences of regular inflectional morpheme forms; only 187 morphemes were deleted, a mere 6.5% of the total occurrences; of the items deleted only 11 were by the native English speakers, 81 were by the native Spanish speakers in the fourth grade, and the other 95 deletions were by the native Spanish speakers in the sixth grade. The morphemes varied greatly on their frequency of occurrence as indicated in Table 1. The most frequent morpheme was the plural, occurring a total of 1298 times, 45.3% of the total. Three verb inflections—the past tense, the progressive, and the third person singular—were the next most frequent, occurring a total of 18.5%, 17.6%, and 11.5%

Type of Morpheme	Number of Deletions	Percentage of Deletions
Perfect	10	14.5
Third Person	45	13.6
Past Tense	68	12.8
Plural	57	4.4
Possessive	2	2.7
Progressive	5	0.9
Comparative	0	0.0
Superlative	0	0.0
Total deletions	**187**	—
Average deletions	—	**6.5**

Table 2. Total percentages of deletions for each inflectional morpheme

respectively. The other four inflectional morphemes—the possessive, the perfect, the comparative and the superlative—each occurred less than 3% each.

As indicated in Table 2, the inflectional morphemes also differed in the frequency with which they were deleted. Three of the four verbal inflectional morphemes were deleted over 12% of the time; the plural, the possessive, and the progressive were each deleted less than five % of the time; and the comparative and the superlative were not deleted at all.

Table 3 reveals the percentage of deletions for only the native Spanish speakers, and as indicated the patterns of deletions for those students in both grades were very similar. With the exception of the progressive inflectional morpheme the verbal inflectional morphemes were much more frequently deleted than the others.

Neither of the two directional hypotheses tested in this study were falsified. To test the first hypothesis, the researchers conducted a one-tailed *t* test comparing the means of the Spanish speakers in the fourth grade and native English speakers in the same grade. A separate-variance test was conducted because the homogeneity of variance test was significant, $F(22, 8) = 333.23$, $p<.00001$. The resulting *t* test was significant, $t(22.3) = 5.17$, $p=.00005$, indicating that the native Spanish speakers in the fourth grade deleted a significantly greater percentage of inflectional morphemes (10.99%) than did the native English speakers in the same grade (.18%).

A one-tailed *t* test was also calculated to test the second hypothesis that native Spanish speakers in the sixth grade would delete a significantly greater frequency of inflectional morphemes than would native English speakers in

Morpheme	Fourth Grade	Sixth Grade	Combined
Perfect	13	38	31
Third Person	23	27	26
Past Tense	35	17	24
Plural	7	7	7
Possessive	11	5	6
Progressive	1	1	1
Comparative	0	0	0
Superlative	0	0	0

Table 3. Percentages of deletions by native Spanish speakers

the same grade. Again, a separate-variance *t* test was calculated as the homogeneity of variance was significant, $F(18, 10) = 3.94$, $p<.05$. The resulting *t* test was significant, $t\ (27.7) = 3.96$, $p=.00025$, indicating that the native Spanish speakers in the sixth grade deleted a significantly greater percentage of inflectional morphemes (9.18%) than did the native English speakers in the same grade (1.8%). Table 4 presents the percentages of deletions for both language groups in both grades.

6. DISCUSSION. The purpose of this paper was to determine if non-native English speakers delete more inflectional morphemes than do native English speakers in the same grade. The statistical results of the first two hypotheses provide direct evidence that elementary school children who are non-native English speakers delete inflectional morphemes more frequently than do native English speakers in the same grade. Specifically, the native Spanish speakers in both the fourth and sixth grade deleted significantly more morphemes than did the native English speakers. These findings confirm those of Gilbert and Grabe (1991) for native and non-native speakers of English in the fifth grade. However, as indicated in the results, the deletion of inflectional morphemes does not occur frequently in the writing of elementary school children, amounting to no more than 6.5% of the groups as a whole and failing to rise above 10.99% for even the group that deletes them most frequently, native Spanish speakers in the fourth grade. These figures do not support the claim that the deletion of inflectional morphemes occurs frequently in the writing of ESL students, even young ones. There may be a reason for the continued perception, however. As indicated in tables 2 and 3, the different inflectional morphemes are deleted with different frequencies, and the ones that have been examined most often—the past tense, the third person

Grades	Language			
	English		Spanish	
	Mean	SD	Mean	SD
Fourth	0.18	0.55	10.99	9.98
Third	1.85	3.39	9.18	6.74

Table 4. Percentage of inflectional morphemes deleted by grade and language

singular of the present tense, and the plural—are among the most frequently deleted by ESL writers.

Though the absolute deletion of inflectional morphemes is low even in the writing of non-native English speakers, the fact remains that they do delete significantly more frequently than do native English speakers. Why should this be the case? The result could be attributed to a difference in level of proficiency; non-native speakers in the elementary years may not have the same level of grammatical competence as do native English speakers and consequently will commit more grammatical errors. However, the studies that have examined the frequency of errors in the writing of native English speakers and non-native English speakers in elementary school have not produced findings that non-native speakers of English consistently produce significantly more errors. In one study, Rodrigues (1974) found no significant difference between bilingual and monolingual fourth graders on the number of morphological and syntactic deviations from Edited American English per 100 words. In turn, Carlisle (1994) found that submersion students in the fourth grade made no more errors per 100 words than did native English speakers in the same grade; however, bilingual students in the same grade made significantly more errors than did the native English speakers. In the sixth grade, the pattern was reversed; bilingual students made no more errors than did native English speakers, but submersion program students made significantly more errors.

However, the results of the study by Gilbert and Grabe (1991), as well as this one, indicate that non-native English speakers in the elementary grades make more errors with inflectional morphemes than do native English speakers, even though the overall levels of error may not be different between the two groups as just discussed (Carlisle 1994). Why should non-native speakers of English make more errors with inflectional morphemes? Whiteman (1981) has noted, among others, that the inflectional morphemes essentially carry redundant information, information that can be retrieved in other parts of the text. The inflectional morphemes are variably deleted by children learning English as their first language, by both children and adults learning English as their second language, and by all of the above groups when they are learning to write English, even in the writing of native English speakers from dialects not noted for the absence of inflectional morphemes. Whiteman (1981) has suggested that the deletion of redundant information may be a natural process in both learning a second language and in learning to write. Thus, the non-native English speakers learning to write in English may be subjected to an interactive effect which reinforces the frequency of deletion: They are learning an L2 and learning how to write in the L2, two situations which favor the reduction of redundant information, especially when carried by bound morphemes.

The results of this study also reveal some interesting patterns in the use of tense and aspect in the writing of elementary school children. As indicated in Table 1, children use the perfect inflectional morpheme very rarely, indicating that they are not using the passive voice or perfect aspect. In fact, the children wrote almost exclusively in the simple present and past tense and frequently in the progressive aspect.

7. CONCLUSION. This study offers several unique insights into the deletion of inflectional morphemes in the writing of children. First of all, instead of examining deletions as just one of many errors and calculating them as a percentage of all errors, this study examines the inflectional morphemes as a unified linguistic category and calculates the deletions as a percentage of the overall actual and potential occurrences. Such an approach affords a true estimation of the strength of deletions. Second, through this procedure, the authors were able to refute two claims about the use of inflectional morphemes in the compositions of the group of writers examined. Contrary to general claims, even though non-native English speakers delete a significantly greater percentage of inflectional morphemes than do native English speakers, the absolute frequency of deletion is low, even for English L2 learners in the fourth grade, who have not had much experience writing in their L2, and who because of their young age and lack of experience do not possess sophisticated composition skills. However, we do not mean to suggest that other groups of writers may not delete a greater frequency of inflectional morphemes. For instance, some beginning adult learners of English may have sophisticated writing skills in their L1 and consequently may attend more closely to global, rather than local, features when first learning to write in their L2. Such a group may delete inflectional morphemes at a fairly high frequency, though how high remains unknown as no other study has examined all eight inflectional morphemes before.

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[1] Mellow and Cumming in this section of their paper were discussing grammatical morphemes of which the inflectional morphemes constitute a sub-division.

[2] Some disagreement exists over whether the possessive morpheme is actually inflectional. Jensen (1990:116) points out that the possessive can be attached not just to nouns but to entire noun phrases such as in *the King of England's hat.* Nevertheless, the possessive will be included as one the eight inflectional morphemes. Its inclusion does not create a problem because it occurs very infrequently in the current corpus of data and because error frequency was tabulated as a percentage: the number of deletions over the sum of actual occurrences and deletions.

[3] To determine if collapsing the data from the two groups of students in different educational programs was justified, the researchers calculated two preliminary *t* tests on the deletions of the inflectional morphemes by the bilingual and submersion students in each grade. Neither *t* test was significant. The bilingual students in the fourth grade deleted 13.11% of their inflectional morphemes and the submersion students in the same grade, 8.67%, a nonsignificant difference: $t\ (21) = 1.07$, $p{=}.297$. The same was true for the sixth graders; the bilingual students deleted 10.11% of their inflectional morphemes and the submersion students, 7.9%, again a nonsignificant finding: $t\ (17) = .698$, $p{=}.49$. We, therefore felt justified in collapsing the two previous groups into one.

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SEMANTIC PROTOTYPES AND THE PRAGMATICS OF *LIE* ACROSS CULTURES

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1. BACKGROUND. The three great monotheistic religions of the world all speak strongly against a 'lie'. In Islam the Quran states in Surah al-Nuur: 7: 'God's curse will rest on him if he is a liar'. In Christianity the Bible says in Colossians 3:9: 'Lie not to one another'. In Judaism the Pentateuch states in Leviticus 1:11: 'Ye shall not steal, either deal falsely, neither lie one to another'. The similarities between these three systems of belief are remarkable, but how do these systems of belief translate into everyday life?

Coleman and Kay (1981) did a study in which they asked subjects to rate statements as to whether they were lies or not. Coleman and Kay were primarily interested in the notion of the semantic feature. The choice of the word *lie* was merely by way of an example of how semantic prototypes are useful. Subsequently, their data raised questions about the semantic features of words that are commonly considered to be the same in another language. Common knowledge holds that the word *lie* in English and the word *kathaba* in Arabic have the same semantic content. This study, therefore, considers the question of whether the distribution and proportion of the semantic features of the word *lie*, as described in Coleman and Kay's study, are the same for the Arabic word *kathaba*.

2. THE STUDY. The study consists of a questionnaire in which a number of stories are given in which a situation is described. For each story, the respondents were asked to decide whether a certain person in the story 'lied' or not. They were then asked to rate their decision according to whether they thought other people would agree with their assessment. Further, comments about their responses or about the stories were invited.

The stories are based around the features of [+/- factual], [+/- belief], and [+/- intention]; that is, first, whether the information in the speaker's statement is or is not factual in the real world; second, whether the speaker believes the statement to be in agreement with real world facts; and, third, whether the speaker intends the statement to deceive or not.

There were eight stories, each one having a different configuration of these three features. An additional two stories were added that Coleman and

Kay did not use, which were intended to elicit a cross-cultural difference between the two lexical items being studied (see Section 4). The stories written by Coleman and Kay were translated into Arabic and were then modified somewhat in order to be culturally appropriate. For example, in Coleman and Kay's Story 5 a man attends a dinner party given by his boss and his boss's wife. In Saudi Arabian society this would never happen since there is strict social separation of the sexes. Accordingly, the story was changed to be just a man attending a dinner party given by his boss and the interaction described in the story is for the man and his boss only. Names were also changed to Arabic names. In all other respects the following stories were similar to the ones used by Coleman and Kay.

(1) Mohammad ate a piece of the cake that his sister Fatmah had made for her visitors to eat when they came. When Fatmah saw that the cake had a piece missing, she asked Mohammad, 'Did you eat a piece of this cake?' Mohammad said, 'No'. Did Mohammad lie?

(2) Ahmad, Omar, and Abdullah had their cars parked near each other. Abdullah dented the fender of Ahmad's car. When Ahmad came out to his car, he asked Omar, 'Did you dent the fender of my car?' Omar replied, 'No, Abdullah did it'. Did Omar lie?

(3) Faisal believes that he has to pass the candy store on the way to the cafe where he will meet his friends, but he is wrong because the candy store has moved. His mother disapproves of his going to the cafe. Faisal's mother asks him where he is going. Faisal says, 'To the candy store'. Did Faisal lie?

(4) One morning Zeinab has a math test that she didn't study for, and so she doesn't want to go to school. She says to her mother, 'I'm sick'. Her mother takes her temperature, and to Zeinab's surprise she really is sick. Later that day she breaks out with the measles. Did Zeinab lie?

(5) Hasan is invited to a dinner at his boss's house. The evening is a very boring one. At the end of it, Hasan says to his boss, 'Thanks for a terrific evening'. Did Hasan lie?

(6) Maryam's mother did not approve of her friend Iman and has asked Maryam not to visit Iman any more. One day Maryam's mother asked her, 'Have you seen Iman this week?' Maryam answers, 'Iman has been very sick for two weeks'. However, Maryam has seen Iman the day before. Did Maryam lie?

(7) Two patients were both waiting for surgery. The doctor points to one and asks, 'Is Ali here the tonscillectomy or the appendectomy?' Nurse Faridah has just read the charts, but she is confused about the patients. She says, 'Ali is the appendectomy' when in fact Ali is the tonscillectomy. Did Nurse Faridah lie?

(8) Waheed has tickets to the final football game. He shows them to his boss, who says, 'Listen, Waheed, that game is on a working day. If you don't come to work that day, you better give me a better excuse than that you were at the game'. Waheed says, 'I will'. On the day of the game he calls up his boss and says, 'Boss, this is the day that I told you that I would be sick'. Ironically, Waheed doesn't get to go to the game. The night before he had felt a little bit sick, and before he could leave the house to go to the game, he gets really sick. So Waheed really was sick when he told the boss he was. Did Waheed lie?

The 117 respondents were native Makkan Arabic-speakers. After they read the stories, they were asked to decide whether the statement was (a) a lie, (b) not a lie, or (c) can't say. In addition, they were asked whether they were (a) very sure, (b) fairly sure, or (c) not too sure that other people would agree with them. The scoring system for the questionnaire was based on the combination of these two rating scales:

Not a lie	– very sure	=	1
Not a lie	– fairly sure	=	2
Not a lie	– not too sure	=	3
Can't say		=	4
Lie	– not too sure	=	5
Lie	– fairly sure	=	6
Lie	– very sure	=	7

In terms of the features under consideration, the stories illustrate all the possible permutations of the features as in table 1.

Story 1 is an example of the classic lie in which all three features are present. The statement is not in agreement with reality, the speaker knows this and the speaker intends to deceive by making the statement. In Story 2 all the features are absent; thus forming a situation in which a lie was not used. On a continuum of 'lie/not lie' these two stories constitute the end points. Also, these two stories were used as a control factor in the study: The questionnaire of any respondent who did not consider Story 1 as clearly a lie and Story 2 as clearly not a lie were disallowed.

Story	P is false	S believes P is false	S intends to deceive
(1)	+	+	+
(2)	-	-	-
(3)	+	-	+
(4)	-	+	+
(5)	+	+	-
(6)	-	-	+
(7)	+	-	-
(8)	-	+	-

Table 1. Possible permutations of the features under consideration

Stories 3 through 8 had various combinations of the features; that is, whether the statement agrees with real world facts, whether the speaker believes the statement to be true or false, and whether the speaker intends the statement to deceive or not.

The means for both Coleman and Kay's results and the present study are as follows:

Story Number	Mean Scale Score (Coleman and Kay)	Mean Scale Score (This study)
(1)	6.96	6.74
(2)	1.06	1.24
(3)	3.66	3.63
(4)	5.16	4.67
(5)	4.70	4.31
(6)	3.48	3.19
(7)	2.97	1.94
(8)	4.61	4.27

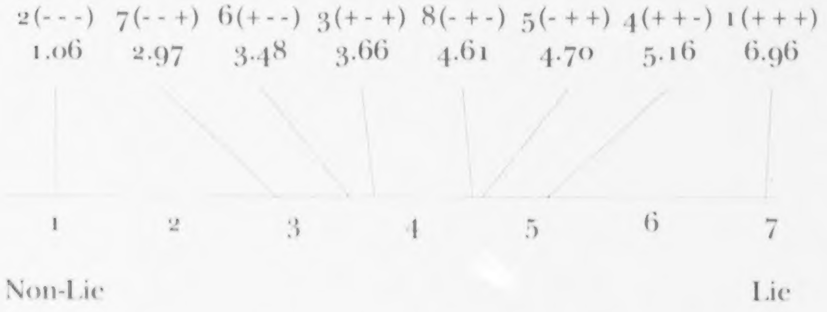

Figure 1. Lie/non-lie continuum from Cole and Kay 1981

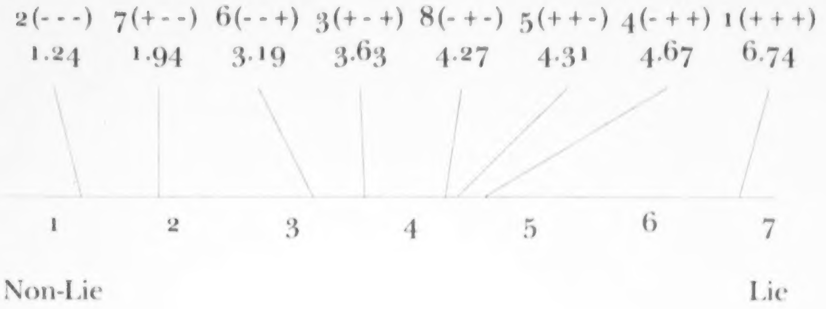

Figure 2. Lie/non-lie continuum in the present study

The mean scale score gives an indication of the strength of the lie or to what degree the respondents considered the statement to be a lie. The results can be visualized by plotting them on a lie/non-lie continuum (Figure 1).

Coleman and Kay's findings indicate that the more features that are positive, the more of a lie their subjects considered the statement to be. The only exception to this was Story 8, which scored higher than Story 3. Coleman and Kay explain this by stating that Story 8 'succeeded least well in conveying to our subjects what we desired' (p. 33). (Note: Coleman and Kay have reversed the feature designation for stories 5 and 4 and also for stories 6 and 7. I believe these were probably typographical errors, but these errors seriously hampered the interpretation of the data.)

3. DISCUSSION. The comments that the respondents volunteered are interesting in that they reveal other features of the word *lie* which should probably be included in an analysis of the word.

In Story 1 about Mohammad and the cake, many comments were made about the age of Mohammad. Age per se seems not to be the salient feature, however. One respondent puts it succinctly, 'since Mohammad's age is not mentioned, he might be young and not yet understand the meaning of lying'. This statement implies that the unacceptablilty of lying is learned. A young age in this case means that the person has not yet been fully taught about lies. An additional feature of *lie* therefore must have something to do with the idea of being taught or being enculturated, that this is learned behavior.

Story 2, of course, is a situation in which there is no lie.

Story 3 includes two positive features: [+false] and [+intention]. That is, the real world facts are contrary to what the statement says, and Faisal is intending to deceive his mother. However, this story is also [-belief], which means that Faisal did not believe the statement to be false. Many comments touched on this fact—'if he knows that the store has moved, he is a liar. If he does not know, he is not a liar'; 'he would not be lying if he did not know that the store had moved'.

Some comments for Story 4 excuse Zeinab on the basis that she was already sick but just did not know it yet and that that is what prevented her from studying in the first place. The majority of comments, however, speak strongly about Zeinab's intention to deceive—'she is considered a liar because she intended to lie and with God's power, her statement became fact', 'because she was not sick, God gave her the condition', 'this situation complies with the Prophet's saying: "Do not pretend to be sick, then you will become sick, then you will die"', 'the Holy Prophet said, "Actions are judged on intentions, and each person is judged according to his or her intentions"'. As can be seen on the continuum, in addition to the number of features present, the intention to tell a lie places the statement most strongly at the 'lie' end of the continuum.

Story 5 exemplifies one of those 'little white lies' or 'social lies'. It can be argued that these kinds of lies are not intended to deceive anyone. Story 5 has two features present and thus is situated on the lie end of the continuum; however, because the feature intention is not present, it is considered less of a lie than either stories 1 or 4. The comments of the respondents are in agreement with this—'it shows good relationship with other people', 'what he said is a compliment to the boss', 'because it was a compliment', 'the purpose of this was to make the boss happy', 'a compliment is necessary at some times', 'Hasan's action was out of respect for his boss's feelings', 'what Hasan said to the boss can be considered proof of his good manners', 'it was only a compliment required by social relationships'.

On the other hand, many of the respondents did realize that a compliment is still considered to be a lie—'social hypocrisy', 'a compliment is a type of lie', 'a compliment is considered a lie if it is not true', 'Hasan could have said that compliment with the intention of getting close to his boss, but this does not prevent him from being a liar'.

Consideration for other people's feelings and situations apparently must also be included in the features of 'lie'. If the lie is told with the interest of the hearer in mind, it apparently is not considered so strongly a lie.

Stories 6 and 7 are ones in which only one feature is present. They rate correspondingly low on the lie continuum because of this. It is interesting to note that because Story 6 has the feature [+intention], it is rated as more of a lie than Story 7. Story 6 is typical of the social situation where a part of the truth is told as a way of not telling a lie. However, as has been noted, the intention is still to deceive the hearer. Many comments reflect this ambiguity—'Maryam misled her mother, but her answer was 100% true', 'there is a type of trickery in Maryam's answer', 'Maryam did not answer her mother's question specifically'.

Story 7 on the other hand has no intention to deceive. The only feature present is [+factual]. The statement given is contrary to the real world situation. Most of the comments do not consider Nurse Faridah a liar. However, it can be noted that the means on the continuum reflect the fact that one of the features is present—'some people might say that if it wasn't the truth, then it was lying'. Most comments, however, did not consider the statement to be a lie—'she cannot be considered a liar because lying is deliberate', 'she did not lie, but things got mixed up', 'a mix-up does not become a lie', 'she never meant to lie', 'she cannot be considered a liar, but she can be considered to have made a mistake, and who has not made mistakes?'

Story 8 mirrors the anomaly in Coleman and Kay (1981). Because of their findings and their comment about Story 8 not clearly conveying their purpose, Story 8 in the present study was written in a way that tried to make clear the fact that even though the real world siutation was not false [-factual] and the speaker did not intend any deception [-intention], the speaker believed the real world situation to be false [+belief]. Even with this careful rewriting, the anomaly is also seen in this study.

Upon careful consideration of the statistical results, the anomaly does not appear to be an anomaly at all. Instead, a hierarchical arrangement of features appears. When the distribution of features along the continuum is examined, it can be seen that the feature [+/- belief] separates the stories into two groups. All the stories to the right have the [+belief] feature; all the stories to the left have the [-belief] feature. The anomaly of Story 8 is therefore no anomaly but follows a principle in which the belief of the speaker is a crucial factor in judging a statement to be a lie or not a lie.

Secondly, within each of these two groups as defined by the feature [+/-belief], it is evident that the next feature of importance is the feature [+/-intention]. In the group that includes the [+belief] feature (stories 1, 4, 5, and 8), stories 1 and 4 are situated on the 'lie' end of the continuum. Stories 5 and 8 are to the 'non-lie' side. In the group that includes the [-belief] feature (stories 3, 6, 7, and 2), stories 6 and 3 are also situated on the 'lie' end of the continuum. Stories 7 and 2 are on the 'non-lie' side.

Thus it appears that of the three features that were studied, the most crucial one is the speaker's belief that the statement is false. The second-most crucial feature is the intention of the speaker to deceive. Whether the statement is in accordance with real world facts is relatively unimportant.

4. CULTURAL DIFFERENCES. While Islam, along with the other great monotheistic religions of the world, excoriates lying and the liar, there are certain situations in which lying is overtly permitted. In spite of this, the findings of this study which replicated Coleman and Kay's 1981 study did not show any basic differences between the American speech community and the Makkan Arabic

speech community. All respondents judged the stories in similar ways, using the same features and the same hierarchy of features.

The religious text that is relevant to this cultural difference is from the Hadith of Prophet Mohammad (Peace be upon him.): 'A liar is not one who tries to bring reconciliation among people and speaks good (in order to avert dispute), or he conveys good. Ibn Shihab said he did not hear that exemption was granted in anything what the people speak as a lie but in three cases: In battle, for bringing reconciliation amongst persons and the narration of the words of a wife to her husband (in order to bring reconciliation between them)' (Sahih Muslim, 1374).

For this reason, two more stories were added to the ones Coleman and Kay used. Story 9 is the story of a reconciliation between husband and wife. Story 10 is a story of a war-time situation.

(9) Nadia and her husband AbdulRhaman were having a very bad fight, to the extent that Nadia went home to her parents' house. Nadia told her brother Salih that her husband had been very mean to her and that she would never go back to him until he apologized. Salih went to AbdulRahman and said to him, 'Nadia just wants you to talk kindly to her'. Did Salih lie?

(10) During the Gulf War, Samir went to visit his father who had his livestock near the Iraq border. By mistake he strayed across the border in the desert and was apprehended by some Iraqi soldiers. When they questioned him, he said, 'I'm Iraqi'. Did Samir lie?

The feature distributions for stories 9 and 10 are the same: [-factual], [+belief], and [+intent]. These features should put stories 9 and 10 in the same position on the continuum as story 4. However, the mean scale scores are different. Story 9 has a mean of 2.89; story 10 has a mean of 3.05. The mean scale scores show a large difference between the mean scale score for story 4 and for stories 9 and 10.

This indicates that there is another factor that is conditioning the responses for stories 9 and 10. Comments made by the respondents indicate that they are aware of the permissibility of lying in order to bring reconciliation between people—'Because it is reconciliation', 'Salih is not considered a liar because he intended to make peace between them, and this is one of the cases in which lying is permitted with the intention to make peace', 'lying to reconcile between husband and wife is permissible', 'the purpose of the lie was to make peace and so it is desirable'.

The recognition of personal danger is also recognized as a factor in the permissibility of a lie. The comments for Story 10 recognize this—'in this situation, Samir is not considered a liar because he wanted to protect himself from danger', 'this situation calls for lying', 'this is a kind of permissible lie', 'this is considered a useful lie because the person is in a situation of self-defense'. Although the majority of comments permitted the statement in Story 10, the means scale score shows that the statement was still considered to be a lie. That is, the means are not grouped on the non-lie end of the continuum. One comment states this explicitly—'Samir is considered a liar, but he only wanted to save himself from the Iraqi soldier, so it was necessary for him to lie in order to protect himself, and there is nothing wrong in that'. Another respondent makes overt mention of the religious aspect—'the truth of the matter is that he is not considered a liar. From the Islamic legal point of view, he is not considered so'.

It can be seen that the hierarchy of the features [+/-factual], [+/-belief], and [+/-intent] as discussed above do not hold for certain situations as detailed in the religious writings of Islam. These situations are clearly defined, however. It seems clear that the semantic features of the word *lie* in the Arabic language must also refer to pragmatics. The stringency with which a statement is judged to be a *lie* must be mitigated by the situation in which the statement is used, in addition to the presence or absence of other features.

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NON-NATIVE PERCEPTION AND PRODUCTION OF ENGLISH ATTITUDINAL INTONATION

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1. INTRODUCTION.* Researchers and educators have recently started to pay more attention to the contribution that nonsegmental factors, such as intonation, rhythm, loudness and stress, make to a foreign accent among second-language (L2) learners. For example, Van Els and De Bot (1987) demonstrated that listeners can use intonational cues in filtered speech to categorize types of foreign accent in non-native speakers of Dutch. Munro (1995) obtained foreign accent ratings by untrained native English listeners of the filtered speech of Mandarin-accented English versus native English. Results showed that untrained listeners can detect a foreign accent based on nonsegmental factors alone. Obviously, these non-native speakers are retaining prosodic, specifically intonational, aspects of their first language when they speak their second language.

However, a non-native speaker's encounter with the L2 intonational system does not end with adapting to the system for statements and questions. An equally important skill to master is how the L2 intonation is used to express emotions and attitudes in the L2. Intonation helps to convey and interpret a speaker's opinions about what he or she is saying, the speech act situation and even about the listener (Crystal 1969; Couper-Kuhlen 1986). Learners must learn to interpret these intonational cues to L2 attitudes correctly. They must also be made aware that using an incorrect intonational accent can make their utterances sound impolite, angry or impatient, for example, when this effect on the first or native language (L1) speakers is not intended. Jones and Evans (1995) reported on work with ESL students to point out and correct the voice quality (e.g., rhythm, stress, intonation, loudness) of various attitudes such as politeness, surprise, boredom. An empirical example of the emotional effect of incorrect intonation on L1 listeners was illustrated by Holden and Hogan

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(1993). Their study found that English listeners tended to interpret English spoken with Russian intonation patterns negatively, ascribing emotions such as anger and arrogance to the utterances.

Thus the potential for misunderstanding a speaker's intent and meaning is quite as possible for a nonsegmental, or prosodic accent, as for a phonological, segmental accent. However, more research needs to be done which systematically investigates non-native speaker production of attitudes in an L2 and the effect that inappropriate prosody and intonation may have on native speaker comprehension.

The present study addresses this issue by investigating the correct and incorrect expression and interpretation of English attitudes by adult Russian speakers of English as a second language. A perception and production study using native English and native Russian speakers and listeners was done to answer four specific experimental questions.

First, how do Russian learners of English compare to native speakers of English in their perception and production of English attitudes? Results to this question will indicate if mistakes in intonation cause attitudinal misunderstandings between native and non-native speakers of English and which mistakes these are.

Second, which of six attitudes (CONCERNED, CONFIDENT, ENTHUSIASTIC, IMPATIENT, POLITE, SKEPTICAL) are perceived best and which worst by both Russian and English speakers? If attitudinal intonation patterns were universal across languages, second language learners would presumably have no difficulty learning the patterns associated with their new language. But if they do experience difficulties expressing and perceiving these attitudes, then perhaps the patterns are language dependent and do not easily cross language boundaries. The answers to this question will suggest which of the six attitudes are language dependent and which are language universal.

Third, can the Russian speakers make the distinction between negatively and positively oriented English attitudes? If a finer discrimination among six specific attitudes is not possible for the non-native speakers to produce or perceive then perhaps a grosser binary distinction between positive attitudes (signalling nonthreatening, accepting attitudes) and negative ones (signalling warnings or threatlike behaviour) will be easier for the learners to make.

Finally, since intonation plays a large part in signalling the grammatical structure of an utterance, will this structure make a difference in how well English attitudinal messages are interpreted and conveyed by the Russian learners of English? It is expected that English statements will be most easily produced and perceived by Russian subjects as the intonation pattern is similar in both languages. Yes–No questions should provide some difficulty since the pitch rise in Russian and English questions is in a different part of the utterance. Wh-questions are the most dissimilar between the two languages and

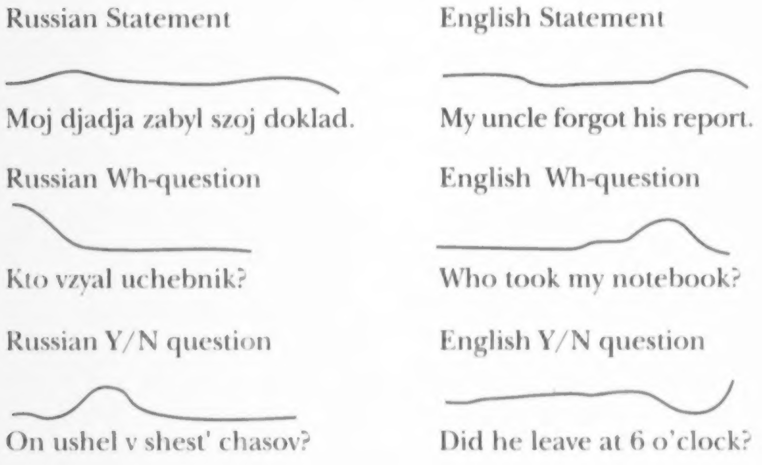
Russian Statement
Moj djadja zabyl szoj doklad.
English Statement
My uncle forgot his report.
Russian Wh-question
Kto vzyal uchebnik?
English Wh-question
Who took my notebook?
Russian Y/N question
On ushel v shest' chasov?
English Y/N question
Did he leave at 6 o'clock?

Figure 1. Russian versus English intonational contours (adapted from Gibson 1989)

should receive the lowest accuracy scores. Russian Wh-questions have a more abrupt falling contour than in English, with the main stress on the Wh-word. Examples of these contours are in Figure 1.

2. METHOD

2.1. STIMULUS PREPARATION. A perception and a production experiment were performed, both of which use the same stimuli and methodology.

Six semantically neutral sentences of English, each in STATEMENT, WH-QUESTION and Y/N QUESTION form, were first designed. Lexical neutrality was maintained so that the subjects could focus on how the utterance was being expressed, with the lexical content as secondary in importance. Twenty-three first-year linguistic students then verified the neutrality of the lexical content of these sentences. The target utterances were then altered as needed to ensure that none of the six sentences evoked a particular attitude. Contexts (3 to 4 sentences) in which the target utterances were contained were then designed to prime a particular attitude. This was done to elicit target utterances as natural-sounding as possible. The target attitudes were CONCERNED, CONFIDENT, ENTHUSIASTIC, IMPATIENT, POLITE, and SKEPTICAL. The six were chosen to represent both positively oriented (CONFIDENT, ENTHUSIASTIC, POLITE) and negatively oriented (CONCERNED, IMPATIENT, SKEPTICAL) attitudes. As well, some attitudes were more Active in terms of amount of pitch range and number of changes (ENTHUSIASTIC, IMPATIENT), while others were chosen to be more passive in this regard (POLITE, CONCERNED).

Polite:
Linda meets an acquaintance in the hall at a hotel. They discover that they both know some of the people. They discuss someone they both know, a woman named Maya. Linda says to the acquaintance politely.
'She has three cats now'.

Figure 2. Example of context plus target utterance.

Each target utterance was located at the end of the context, as a sentence spoken by the main character in the context. These contexts were vetted by another group of 25 native English-speaking linguistic students so that the majority agreed that each context would evoke one of the six attitudes being tested. The target utterance appeared in one of three syntactic forms: STATEMENT, WH-QUESTION, Y/N QUESTION. An example of the POLITE context with the target utterance in statement form is shown in Figure 2.

2.2. PROCEDURE. The first set of stimuli were produced by 10 native speakers of English (5 male, 5 female; mean age 28), mostly undergraduate students who knew no Russian. They read the six attitude contexts into a Sony ECM 5000 portable tape recorder with a Sony electret condenser microphone approximately 8-inches away from their mouths. Each context was contained on a 5 x 7" card labelled with the attitude. Subjects were told to read over each context to themselves and, when ready, to read it in as natural a manner as possible, such as when telling the story to a friend. Subjects first practised with a context designed to elicit a target utterance of SURPRISE.

The 60 stimuli were then prepared from these subjects by separating the target context from each context and digitizing the former onto computer using a SoundEdit 16 program. The sixty utterances were then randomized via computer and rerecorded onto a separate audio tape to serve as native speaker (NS) stimuli.

The next stage of the experiment involved eliciting stimuli as well as perception data from native Russian speakers of English as a second language, who were high intermediate to advanced in speaking level. These 10 Russian speakers (5 male, 5 female; mean age=31; mean number of years in Canada=4), mostly graduate students, read the same contexts in English into a tape recorder in exactly the same fashion. These 60 non-native speaker (NNS) stimuli were digitized and randomized exactly as the native speaker (NS) stimuli were, resulting in a NNS stimulus tape.

These same Russian subjects then served as participants in the perception part of the experiment by listening to the 60 NS utterances and deciding for each utterance in a forced-choice task which one of the six attitudes they thought was being expressed by the speaker. The task also required subjects to decide whether they thought the overall 'mood' of the utterance was POSITIVE, NEGATIVE or NEUTRAL. A distracter task was performed in between the production of stimuli and perception task. The first distracter was to describe a picture story into the microphone. The story consisted of 10 line drawings of a day in the life of a student, 'John'. This task, the 'John Test', was in fact an English as a Second Language Oral Placement task. Each subject was later ranked according to the test in terms of oral proficiency and fluency in English. A second distracter was the filling out of a language background questionnaire including personal information for statistical purposes, as well as a number of questions regarding attitudes towards learning English and opinions about their own performance in speaking English.

In the last stage of the experiment, another group of 10 native English speakers (5 male, 5 female; mean age 25) produced another set of 60 utterances (which were not used as stimuli) in order that each experimental group performed the same tasks and in the same order. The distracter task for these NS subjects consisted of the same 'John test' picture story and a shortened version of the language background questionnaire. These subjects then performed two perception tasks. First they listened to and classified the 60 NS, or English speaker stimuli, and then immediately after, the 60 NNS or Russian speaker stimuli, using the same forced choice task.

The resulting data were classifications of six English attitudes by three groups of speakers and listeners. The first was the control group of native English speaker production as perceived by native English listeners (NS-NS group). The second group was native Russian perception of native English speakers (NNS–NS group). The third group was Russian-speaker production as perceived by native English listeners (NS–NNS group).

3. RESULTS. A three factor ANOVA with repeated measures was performed on the data. The Between factor was Group, with three levels. Attitude (6 levels; CONCERNED, CONFIDENT, ENTHUSIASTIC, IMPATIENT, POLITE, SKEPTICAL) and Syntax (3 levels: STATEMENT, WH-QUESTION, Yes–No (Y/N) question) were the repeated factors.

> Question 1: *How do Russian speakers' perception and production of English attitudes compare to native English speakers?*

Results show a significant main effect for Group ($F(2,27)=5.60$ $p<.01$) As expected, Russian listeners are significantly worse at perceiving all six of the native English attitudes than are English-speaking listeners (see Table 1). As well, the fact that English listeners are significantly worse at correctly

Group	Average % Correct
NNS–NS	42
NS–NNS	39
NS–NS	51

Table 1. Group factor results

perceiving Russian speakers than they are at perceiving English speakers suggests that Russian speakers are significantly worse at *producing* English attitudes.

Question 2: *Which attitudes are perceived best and worst?*

The other significant main effect was for the factor of Attitude ($F(5,135) = 4.26$ $p<.01$). SKEPTICAL was the easiest to perceive and CONCERNED the most difficult overall (see Table 2).

Interestingly, it is the Negative emotions, IMPATIENT and SKEPTICAL, which were best perceived by all three groups.

The interaction of the factors Attitude x Syntax was also highly significant $F(10,270)=24.75$, $p<.01$). This means that how well a particular attitude was perceived depended on its syntactic form. CONCERNED statements and CONFIDENT question types were least well perceived overall. Best perceived were IMPATIENT and CONFIDENT statements and CONCERNED and SKEPTICAL Y/N questions. These best and worst pairings make sense intuitively since speakers ask questions if they are concerned or skeptical about a situation, thereby requiring further information or confirmation from their interlocutor. Such circumstances would not tend to generate as many factual statements. It is also more plausible to make a statement about a situation rather than ask a question while expressing a confident attitude, explaining why statements are associated with the attitude of CONFIDENT in the results.

Attitude	Average % Correct
skeptical	53
impatient	48
concerned	47
polite	43
enthusiastic	40
confident	34

Table 2. Attitude factor results.

	Average % correct		
Syntactic Type	**NS-NS**	**NS-NNS**	**NNS-NS**
y/n question	55	40	47
statement	47	38	48
wh-question	51	40	30

Table 3. Syntax x Group results

Question 3: *How well are positive and negative attitudes distinguished?*

An F-test to compare the NS–NS group with the NNS–NS in categorizing a speaker's mood as positive was not significant ($F(1,18) = 2.3$, $p > .1$). In other words, Russian listeners are able to perceive the binary difference between positive and negative attitudes spoken by English speakers as well as native English listeners are.

Question 4: *Do syntactic intonation patterns influence attitude perception and production?*

Of the three syntactic types, Wh-questions are the least well perceived and Y/N questions the best ($F(2,54) = 4.35$, $p < .05$).

The result for Wh-questions accurately reflects the quite different intonation pattern used for English versus Russian Wh-questions. On the other hand, Y/N questions were surprisingly well perceived. Apparently, the Russian speakers are adapting better both in perceiving and producing the change in location of the pitch rise here.

The significant Syntax x Group interaction ($F(4,54) = 4.78$ $p < .01$) underlines this effect by showing that Russian listener scores on English Wh-questions are perceived correctly only 30% of the time. In general, the native English listeners are perceiving both Russian and English statements, Wh-questions and Y/N questions with roughly the same degree of accuracy, as shown in Table 3.

The interaction of Attitude x Group was not significant. $F(10,135) = 1.02$, $p > .1$. In other words, all three groups had the same basic accuracy pattern. This was verified by a highly significant chi-square analysis which compared each group's observed and expected pattern of accuracy and errors (NS-NS: $\chi^2 = 621.87$, $p < .001$; NNS–NS $\chi^2 = 312.44$, $p < .001$; NS–NNS $\chi^2 = 367.1$, $p < .001$)). All groups tended to confuse CONFIDENT as POLITE, and the NS–NS and NS–NNS groups misperceived it as IMPATIENT as well. Both the NNS–NS and NS–NNS groups perceived IMPATIENT as CONCERNED. Although the Russian speakers produced the highest number of confusions, all except those errors associated with CONFIDENT were only slightly above chance level. Whether a native or non-native speaker is talking or listening makes a difference for the correct expression and perception of English attitudes. The experimental results indicate that interactions between English speakers and Russian speakers of English as a Second Language are vulnerable to attitudinal misunderstandings. Although the binary distinction between positive and negative attitudes is being perceived and produced by these non-native speakers, they have not yet mastered the expressions of individual attitudes within these two types.

The fact that the two experimental groups containing a non-native speaker or listener showed the same relative pattern of accuracy indicates that the intonational patterns of these attitudes are not language universal. In other words, the Russian speakers cannot depend on their L1 intonational patterns to express and perceive attitudes in the L2. However, this conclusion must be balanced against the fact that the native English speakers had difficulty with the same attitudes as the non-native learners. No one particular attitude stood out as one that the Russian subjects are consistently mistaking for another. In fact, the only consistent confusion was the interpretion and expression of the attitude CONFIDENT as POLITE. All three groups showed this trend. However, this error suggests not so much that the intonational expression of CONFIDENT is language dependent, as that CONFIDENT was a fairly ambiguous attitude in this experiment. Its prosodic characteristics were easily mistaken for those of other attitudes such as IMPATIENT, POLITE and CONCERNED.

As for the syntactic form of the utterance, it obviously makes a difference in how accurately an attitude is perceived or produced. Low WH-QUESTION scores clearly indicate that Russian speakers need to be especially aware of the intonational difficulties that this question-type poses. As well, the fact that Y/N QUESTION and STATEMENT scores vary widely along the six attitudes illustrates the natural associations and disassociations that certain attitudes have with particular syntactic forms. These pairings may prove helpful to the Russian speakers in conveying and interpreting those attitudes to native speakers, just as they do for native English speakers.

It is noteworthy how difficult the experimental task was for all of the subjects, native and non-native speakers alike. The overall average accuracy score for all attitudes was only 44 percent correct. This low score probably reflects the lack of social and lexical context which would normally help listeners interpret attitudes.

The main conclusion that can be drawn from the experiments is that Russian learners of English need more systematic practise of the English intonational system for expressing attitudes. At the very least, these learners, and perhaps all non-native speakers of English, need to be made aware of the danger of potential attitudinal confusions and misunderstandings which can interfere with and distort the attitudinal content of the messages they are trying to convey.

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PURPOSE CLAUSES IN ENGLISH AND KOREAN

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THIS PAPER DEALS* with purpose clauses in English and Korean, which are expressed by several conjunctions in each language, e.g. *in order to, to, so that* in English, and *-le, -lyeko, -ki.wihaye* in Korean. It suggests different functions of purpose conjunctions in discourse by studying their context and frequency. It discusses the question of information flow and iconicity as it relates to the contrastive positioning of purpose clauses in the two languages.

Purpose clauses in English are adverbial subordinate clauses which may occur either before or after the main clause, but they show a strong tendency to be postposed to the main clause (Thompson 1985).[1] Such positioning is considered iconic, in that the goal expressed in the purpose clause is logically and temporally subsequent to the action stated in the main clause. A preposed purpose clause, according to Thompson, generally has a pragmatic function of presenting a problem or orienting the reader to a larger discourse span than its own main clause. She points out that the preposed position of such purpose clauses can also be considered iconic, in that naming a problem in purpose clauses must precede main clauses which provide the solution.

In Korean, a strongly verb-final language, purpose clauses are preposed, following the general rule of having no postposed clauses except in conversational, oral data. Does this mean, then, that information flow in purpose constructions in strongly head-final languages is always contrary to the iconic principle? I will argue against that and propose that the mental process of purpose or goal (which might be a recognition of a problem or need) would always precede the carrying out of an action (means) towards the goal, although the realization of the goal follows the action. Seen this way, purpose clauses in a language like Korean cannot be labeled simply contrary to the notion of iconicity.

Sections 1 and 2 describe the morphosyntax of purpose conjunctions in English and Korean respectively, suggesting that each form has different func-

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tions in its discourse and pragmatic context. Section 3 discusses the position of purpose clauses in relation to information flow and iconicity.

1. PURPOSE CLAUSES IN ENGLISH. There are several expressions in English that encode purpose relations. The infinitive (those paraphraseable with *in order to*) is the most common form, although its interpretation as purpose depends on context. Infinitives in a 'close-knit' structure are not considered to be purpose clauses as they may be governed by verbs (e.g. *want to go, try to do*), adjectives (*happy to see*), or nouns (*reason to believe*).[2] The complex conjunctions with infinitives are more explicit for purpose: *in order to* and *so as to*. The conjunction *in order to* is an example of grammaticalization from a noun to a conjunction (Traugott, p.c.). Karlsen (1954:12) points out that *in order* means 'disposed in a specific order', but in everyday use of the conjunction today, we don't think about the meaning of the word *order*. The word can no longer take an article (**in the order to*) in the expression of purpose, similar to 'substitutive' complex prepositions like *instead of* (**in the stead of*), *in place of*, and *in lieu of* (Schwenter and Traugott 1995).

All three conjunctions with *to* are primarily used in the same subject (SS) context with its main clause, but a different subject (DS) is possible with the less common construction with for X to, or when the implied subject is coreferential with the main clause object (*We had to teach them...* to *be ready for anything*) or with an implied agent or some other noun, e.g. 'a researcher' in *To test the accuracy of the guess, more data are taken.*

When the subject of the purpose clause is different from that of the main clause, conjunctions with *that* are commonly used, as in *so that* or *in order that*. Also possible is the use of *that* by itself (either SS or DS), as in *He got out at Charing Cross...* that *he might reach Jermyn Street by better lighted ways.* However, *that* demands heavy input from context for the purpose interpretation since it is more commonly used as a complementizer or relativizer, e.g. *I thought* that *I was rich; the first thing* that *came into my head.* The best clue that clauses with *that, so that,* and *in order that* are purpose clauses is the use of a modal auxiliary, e.g. *may, might, should, could,* which replaced the subjunctive mood in the verb of the purpose clause in Old English (Karlsen 1954:10). We can group the markers of purpose as follows:[3]

	With *to*	With *that*	
Simple conjunction	*to*	*that*	(+modal)
Complex conjunction	*in order to*	*inorder that*	(+modal)
	so as to	*so that*	(+modal)

The conjunction *so that* (or *that*) may express purpose or result (Quirk, et al. 1985): *The decision was made* so that *peace* should *prevail* (Purpose), and *We planted hundreds of shrubs*, so that *by August the garden had improved out of all recognition* (Result). Similarly, Karlsen (1954:13) notes that *so that* indicates 'a result purposely brought about, an intended result': 'The way in which it came into existence may be inferred from instances where *so* stands detached with the meaning "in such a manner", and is followed by that introducing a consequence'.

The distinction between purpose (final cause) and reason-result (efficient cause) is suggested as a linguistic universal (Longacre 1996:71–72), although some languages use the same or similar morphology. Longacre notes that, in Ilianen Manobo (Philippines), while the same particle *su* indicates both purpose and reason, only non-past tense is used for purpose. In other languages, the same or similar morphology used for purpose also expresses reason (as in Ngizim & Kanuri, as discussed by Thompson and Longacre 1985:185–86), result (in Tugun, Hinton 1991), simultaneity or sequence (in Mbyá Guaraní, Dooley 1992b:99). Payne (1991) describes Panare from Venezuela as having two medial clause suffixes, *-séjpe* and *-ñépe*, and one adverbial clause suffix *-tópe* to express purpose, but each one has a different usage: *-séjpe* for succession or purpose, and high continuity (with SS); *-ñépe* for succession or movement/purpose, and low continuity (with DS); *-tópe* for more immediate sense of purpose (more logical).

Thus, it is not unusual for one form to express more than one semantic relationship between clauses, whose interpretation is usually dependent on context. Instead of a one-to-one correspondence between form and meaning, there may be, then, one form to more-than-one meaning, or several forms to one meaning. I assume that there is a motivation for such non-isomorphism. Karlsen (1954) states that the complex conjunctions tend to occur more in written discourse because of their logical explicitness, while simple conjunctions occur more in colloquial speech for their handy, short forms. Beyond this generalization, however, we should note that *to* is the most common form and *that* probably the least common one regardless of the style, oral vs. written, and that the complex form *so that* occurs frequently in both styles. The markers of purpose may now be grouped as follows in terms of their semantic explicitness or precision:

Purpose (Final cause)	Overlapping with other functions	
in order to	*to*	(Infinitive in close-knit structures)
in order that	*that*	(Complementizer/relativizer)
so as to	*so that*	(Result)

Why, then, are imprecise conjunctions used? In his study of Mbya Guarani texts, Dooley (1992a) reports that specific semantic markings indicating 'because' or 'in order to' are used only in 25% of the cases, while a nonspecific, imprecise chaining structure is used in 75%. He suggests that the imprecise ones are used to preserve the overall purpose of the communication by omitting less relevant specifics, or to hint at several alternatives at once without opting for only one way, i.e. there is a little of several ideas intended. Similar observations can be made about the use of *to, that,* and *so that* for purpose in English.

In the English text of *The Little Prince,* only three conjunctions, *to, so that* and *in order to,* are used for purpose. Their distribution—between SS and DS, and Preposed (Pr) and Postposed (Po)—are shown below.

	Total	SS	DS	Pr	Po
to	27	26	1	2	25
so that	11	4	7	–	11
in order to	2	2	–	–	2
Total	40	32	8	2	38

The fact that only 2 (with *to*) out of 40 total of the purpose clauses are preposed confirms Thompson's results. Note also that those with *to* and *in order to* are all SS (except one), but only 4 out of 11 *so that* clauses are SS, showing the predilection of so that for DS. In fact, this is an unusually high percentage of SS for *so that* clauses, which is due to the repetition of the same pattern three times: '...the little prince repeated, *so that* he would be sure to remember'.

Pike, in his book *Linguistic Concepts,* has primarily used *to* for purpose clauses, with *in order to* and *so that* (6 tokens, and 4 more for result):

A high frequency of preposed clauses (18 out of 86)—even higher with *in order to*—might be due to the text being expository; the preposed clauses are used for text organization, presenting the need or problem before the main clause:

	Total	SS	DS	Pr	Po
to	72	49	23	13	59
so that	8	5	3	5	3
in order to	6	–	6	–	6
Total	86	54	32	18	68

(1) a. In order to *meet this need, the theory adds the perspective of wave.*
b. *The intellect,* in order to *get outside itself and* to *interpret the sense data... needs... some kind of idea...*
c. To *test the hunch, a formal theory is built and used.*

Certainly, the complex conjunction *in order to* strongly expresses the logical relationship, in both (1)a and (1)b. It is interesting to note that in (1)b the second purpose clause may not smoothly repeat *in order to* as it seems overly strong to do so. Also noteworthy in the same example is that the subject of the main clause is fronted in the sentence; in effect, the two purpose clauses are inserted between the main clause subject and the verb.

For the frequency of different conjunctions of purpose from a larger text base, a computer printout of *The Weymouth New Testament* was used. The count of examples with the following four conjunctions is shown below in a descending scale.[5] We need, however, to keep in mind that translated material may give a skewed result from a vernacular source. I did not include *to* and *that,* which are far more frequent and which may express some other relation than purpose.

so that	*in order that*	*in order to*	*so as to*	Total
137	117	60	23	337

All purpose clauses with *in order that* are followed by a modal (84 by *may,* 30 *might,* 3 *should*). Those with *so that* are counted as purpose when they are followed by a modal (135 total—96 by *may,* 17 *might,* 7 *should,* 6 *will,* 4 *could,* 3 *can,* 1 each *shall* and *would*), or when the verb is uninflected (one of the two examples is: *Gather up the broken portions that remain over,* so that *nothing* be *lost*). There are 54 additional examples with so that that are interpreted as result (e.g., *But suddenly there arose a great storm on the Lake,* so that *the waves threatened to engulf the boat*). In the text counts for *The Little Prince* and *Linguistic Concepts,* no example of *in order that* was found but some examples of *in order to* were found. In this version of the New Testament, *in order that* (which could be considered archaic) is far more frequent than *in order to.*

2. PURPOSE CLAUSES IN KOREAN. Purpose is expressed in Korean by *-le, -lyeko, -koca, -ki.wihaye,* and *-tolok.* These forms are suffixed to the verb of a non-final (medial) clause of a chain, indicating some purpose for carrying out the event or action of the final clause. All the examples of purpose clauses from texts have no other verbal inflection in the verb for tense, aspect, and mode, except for very limited inflection for negative or passive. The morphosyntax of these alternative forms is described next, including semantic and pragmatic criteria such as motion and action/topic continuity.

The shortest form *-le* is limited to occurring only with main clause verbs of motion (locomotion) and dispatch, e.g. *ka* 'go', *tani* 'move around', *ttena* 'leave', and *ponay* 'send'. Often, *-le* is immediately followed by these verbs, in effect creating a construction reminiscent of serialization, but intervening material may occur as in the following example (where MOD = modifying ending):

(2)	*kulentey*	*ap*	*mot-po-nun*	*pun-i*	*muet*
	by the way	front	unable-see-MOD	person-NOM	what
	ha-le	*pam.cwung-ey*	*ilen*	*kos-ul*	*naosyesso*
	do-PUR	night-at	like this	place-ACC	came out

'Well, why [for what purpose, lit. to do what] did (you), a person who cannot see, come out here at night?'

The conjunction *-lyeko* encodes a variety of purposive, intentional material and may be described as a combination of *-lye* (intention)[6] and *-ko* (perhaps the most frequently used clause connector in a chain with the meaning of 'contiguity'): 'one's intention to do something or one's purpose for doing something is contiguous to another action' (Lee 1993:449).

(3)	Sim	Pongsa-nim-un	ttal-i	o-nunka	po-*lyeko*
	Shim	Bongsa-HONOR-TOP	daughter-NOM	come-if	see-PUR
	ciphangi-lul	uyciha-ko	etwuwun	pakk-ul	nakasikey.toyessupnita
	cane-ACC	lean-and	dark	outside-ACC	went out

'Shim Bongsa went outside in the dark, leaning over (his) walking cane, to see if (his) daughter was coming.'

As either a close-knit (as in 'try to do') or detached type for purpose, *-lyeko* is certainly frequently used.

-koca predominantly occurs in written (perhaps a bit archaic) style and is frequently used in a close-knit structure. In most occurrences, it is replaceable with *-lyeko*. The three forms described so far, *-le*, *-lyeko*, and *-koca*, are used in a same subject/topic (SS) situation creating high continuity of intentional agent.

(4)	yenghyang-ul	kyengko.ha-koca	kihoyk.haytta
	influence-ACC	warn-PUR	planned

'(We) planned (something) to warn against… influence.'

The hallmark of final cause, most closely corresponding to *in order to* in English, is *-ki.wihaye* although it is normally not recognized as an interclausal connective. Morphosyntactically, *-ki.wihaye* is a combination of *-ki* a nominalizer to be attached to the verb in purpose clauses, and the verb *wiha* 'be for, care for' with an adverbial ending *-ye* (or its variants *-y* and *-yse*). When *wihaye* follows a noun phrase with the accusative case marker *-(l)ul*, it can actually function as a postposition marking a benefactive: *atulul wihaye* 'for (my/his) son'. It seems plausible to posit a grammaticalization process:

(5)	Verb		Postposition		Subordinating conjunction
	'be for'	→	Benefactive	→	Purpose
	wiha		NP-*(l)ul wihaye*		CLAUSE-ki.wihaye

This type of grammaticalization is not unusual among languages, as discussed by Heine, Claudi, and Hünnemeyer (1991).[9] It also conforms to the unidirectionality of grammaticalization, from a lexical item (a verb, here) to an adposition and then to a conjunction (cf. Genetti 1986 for a similar process in Bodic languages). Thus I argue that *-ki.wihaye* is a complex conjunction explicitly indicating purpose, as much as *in order to* is in English. Similar to the loss of the article in *in order to*, the accusative marker *-lul* does not occur after *-ki* (**-ki-lul wihaye*), a further piece of evidence for grammaticalization to a conjunction.

Close correspondence of *-ki.wihaye* with the benefactive is seen in natural text examples in which there is some parallelism between the two (cf. Heine, et al. 1991 for similar examples from other languages). In (6), the benefactive and purposive ideas are used as something comparable to each other in a parallel way:

(6) nwukwu-eykey po-i-*ki.wihay*-ka ani-la na-*lul.wihay*
who-to see-CAUS-PUR-NOM be.not-but I-for

ettekhatunci talla.cye-ya.hanta
however.way become.different-must

'(I) must become different somehow, not to show someone, but for myself.'

When the whole purpose clause is to be topicalized, *-ki.wihaye* is used with the topic marker *nun*; no other purpose marker is used in this function as can be seen in the following ungrammatical forms: **-le-nun*, **-lyeko-nun*, **tolokun*, **koca-nun*.[10]

(7) imik tanwi-ka concay.ha-*ki.wihayse-nun* coken-i itta
emic unit-NOM exist-PUR-TOP condition-NOM exist
'In order for the emic unit to exist, there are conditions.'

In most examples, *-tolok* links two clauses with DS (thus low continuity of topic). The subject of the final (main) clause tries, advises, or orders the subject of the purpose clause to act in a certain way. In this sense, the final clause subject has little control over the situation since the purpose may not be carried out (low action continuity). While *-tolok* is frequently used with verbs of speech (advise, order, promise, demand, and persuade) in a close-knit structure as a complementizer (Kim 1978), it also expresses purpose, as in (8).

(8) cal po-l.sswu.it-*tolok* elkwul-ul punmyenghi kulyetta
well see-can-PUR face-ACC clearly drew
'(I) drew the face clearly so that (people) can see (it) well.'

Similar to English *so that*, *-tolok* may be used to express result depending on context. Choi (1971) calls it *michim-kkol* 'reaching/arriving form'. In (9), not only are the subjects in the two clauses different, but also the first clause subject is an inanimate noun denoting time; hence the translation 'until'.

(9) pam-i nut-*tolok* nolatta.
night-NOM late-PUR played
'(They) played until it was late at night.'

The five different suffixes expressing purpose with their differing focuses may be roughly summarized as follows:

(10)	*-le*	Only with motion verbs
	-lyeko	Intention
	-koca	Intention (more common in written texts)
	-ki.wihaye	Purpose/teleology (more logical than event-oriented)
	-tolok	Purpose, result, or complementation

-le, *-lye(ko)*, and *-koca* are exclusively used for SS purpose clauses. In case of *–ki.wihaye*, SS vs. DS topic continuity or action continuity is no longer the primary concern, but the deliberate purposive logical connection is. *tolok*, which encompasses other functions beyond purpose (i.e. result and complementizer), is largely DS.[11]

For the frequency of usage and the distribution pattern of SS vs. DS, purpose clauses were counted in the eight narrative texts from Hwang (1987). They, however, yielded only 14 tokens, all with SS: 6 with *-le*, 5 *-lyeko*, 3 *ki.wihaye* (and additional ones in a close-knit structure). Apparently, narrative texts may use only a few purpose clauses. In the Korean translation of *The Little Prince*, there are 15 examples, all with SS except for *-tolok* with DS:

-le	*-lyeko*	*-ki.wihaye*	*-tolok*	Total
4	3	5	5 (DS)	15

The distribution of purpose clauses in the Korean translation of *Linguistic Concepts* (Pike 1982, trans. 1994) is as follows (with 40 more examples in a close-knit structure with *-lyeko*, *-koca*, and *-tolok*, similar to the infinitive in English):

	SS	DS	Total
-lyeko	4	–	4
-koca	1	–	1
-ki.wihaye	33	12	45
-tolok	8	15	23
Total	46	27	73

There was no example with *-le*, which can only occur with motion verbs and therefore is more likely to occur in narrative. The logical conjunction *-ki.wihaye* is most frequent in this expository text, followed by *-tolok*. Non-action verbs are used either in purpose or in main clauses only in the case of *-ki.wihaye*. (Note in example (7), in which the topic particle nun follows *-ki.wihayse*, the verbs in both clauses are non-action.)

To sum up, a scale is presented that shows high continuity with SS at the left end and low continuity with DS at the right end.

(11) High continuity (SS) ↔ Low continuity (DS)

-le *-lyeko/-koca* *-ki.wihaye* *-tolok*
Motion and Event in main clause — Purpose (or result)
More event integration — Less integration

The high continuity form *-le* is shortest, suggesting an iconic relationship between a short linguistic expression and a short semantic distance between the events encoded in two clauses (Haiman 1983). Givón (1990:826) also presents an 'Iconic relation between event and clause integration': 'The more two *events/states* are integrated semantically or pragmatically, the more will the clauses that code them be integrated grammatically.' The forms *-lyeko* and *-koca* signal high continuity of topic/participant (with SS) and of action. *-ki.wihaye* is also high in topic continuity (100% in narrative and 73% in expository), but may be low in action continuity in that it may link clauses with descriptive, static information, in addition to eventive, dynamic information.

I propose that in Korean the high end correlates with more integration of events, while the low end correlates with less integration; in fact, *-ki.wihaye* focuses more on the logical relationship than on integration of events. At the low end, *-tolok* is low in continuity (mostly DS) and diffused in meaning (having a purpose, result, or complementation interpretation). When it functions as a complementizer, however, it might show high integration (Lehmann 1988). Thus its position on the continuum is rather tentative at the moment.

3. INFORMATION FLOW AND ICONICITY. In Thompson's study (1985) of purpose clauses in written English discourse (only those with *in order to* or with *to* paraphraseable as *in order to*), 82% of the examples from narrative and procedural texts were final (postposed), and 18% were initial (preposed). Here is an example from her study:

(12) Brendan was rushing madly farther and farther out to sea. *To slow her down* we streamed a heavy rope in a loop from the stern and let it trail in the water behind us to act as a brake, and hopefully, to smooth the worst of the wave crests. From the stern also dangled a metal bucket; only twenty-four hours earlier we had been using it to *cook an excellent meal of Irish crabs.* Now it clanked mournfully every time a wave broke against it.

She notes that initial purpose clauses have a text-organizing function of a larger scope, while final purpose clauses are more closely tied to the main clause playing a more semantic role which is much more local.[12] She claims iconicity in both types. In final clauses the goal towards which some action is carried out follows that action in real time. In initial clauses the discourse role of guiding the reader's attention by naming the problem precedes the clause naming the solution. Givón (1990:837) recapitulates Thompson's findings noting that the preposed purpose has a broader scope not necessarily referring to the main-clause agent's purpose, while the postposed purpose typically codes the intent of the agent of the main clause, with the following illustration:

(13) *To* illustrate this, consider the following passage.
*Consider the following passage *to* illustrate this.

Payne also describes purpose as iconically following the current event which is encoded in the main clause. Interestingly then, Korean presumably follows the iconic order in all clause combinations except the case of purpose. When the information flow needs to be adjusted to have the purpose clause follow the main clause denoting a current event (or means), a special construction such as an equational sentence is used, as in (14) from *The Little Prince* (which includes several examples of this structure):

(14)					
	nay-ka	yekise	ku-lul	myosa.hay.po-lye	ayssu-nun
	I-NOM	here	he-ACC	describe-PUR	try-MOD
	kes-*un*	ku-lul	ic-ci	anh-*ki.wihayse*-ta.	
	fact-TOP	he-ACC	forget-COMP	NEG-PUR-be	

'*That* I try to describe him here *is* not *to* forget him.'

This type of adjustment of information flow is not uncommon. The temporal conjunction *-ki.cen-ey* 'before' is frequently used, and spatial reorientation can also be indicated as in: *Chicago-lul thonghay LA-eyse NY-ulo katta* 'Through Chicago (I) went from LA to NY'. In the case of logical relations, however, the adjustment is more marked using such constructions as equational sentences, as in the following sentence for the flow of result-reason: '*That* Joey and Billy of Seattle can be compared easily *is because* they share maleness, youth, and the same community' (trans. from Pike 1982:43).

Korean displays strong head-final features at all levels of grammar. A sentence in Korean ends with the final, main clause, whether the information in preposed clauses is iconically prior to that in the final clause or (allegedly) non-iconic as in purpose clauses, reaffirming the overwhelming regularity in Korean of implicational universal features derived from the basic word order of SOV (cf. Hwang 1994a).

In addition, I here propose a new line of argument for possible iconicity in the purpose clause of the Korean type. Payne says that the purpose and the result of an action are similar in that both are logically subsequent to that action, but I think the two types may be separated within logical relationship, as shown below in metaphorical connections between spatial, temporal, and logical relations:

(15) Space:	Origin	→	Here	→	Destination
Time:	Anterior	→	Now	→	Subsequent
Logic:	Reason	→	Current event	→	Result
	Need/motivation	→	Means	→	Purpose

The (irrealis) event or motivation stated in the purpose clause is directed toward the future, but it is subsequent to that of the main clause only when it is realized or accomplished. In fact, the idea or motivation (which may be paraphrased as reason/cause) precedes the event expressed in the main clause. The information in purpose clauses may not be realized, as it is possible to deny that it happened. When one says, 'He went out to look for his boy,' the need to 'look for his boy' presumably occurs before his action of 'going out.' It might be the case, however, that 'he went out intending to look for his boy, but he actually didn't look for him because the boy just showed up.' Thus, conceivably, there may be three stages in purpose: the mental process of purpose or motivation, the main clause action, and the (potential) carrying out of the purpose idea. Although languages may not commonly encode all three stages in a typical purpose construction (for reasons of economy, for example), it seems plausible to think of purpose in terms of these three stages. If this assumption is correct, the final purpose clauses in English-type languages are iconic relative to the last two stages (means and purpose), while the preposed purpose clauses in Korean-type languages (and those preposed ones in English) are iconic relative to the first two stages (need/motivation and means). We may add a comment that the principle of iconicity can be applied with profit in linguistics, but demands caution.

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[1] Note Greenberg's (1966:84) Universal 15: 'In expressions of volition and purpose, a subordinate verbal form always follows the main verb as the normal order except in those languages in which the nominal object always follows the verb'.

[2] The distinction between the close-knit structure (as in verbal complements with main verbs like *intend, allow, advise, force*) and the purpose clause may not be clear-cut. Different verbs are, in fact, at different points on a continuum, with verbs like *attempt* and *design* around the middle (*he attempted* to *help, the approach here is designed* to *serve*), where the purposive idea is still strong. Those preceded by nouns may also be ambiguous between the postnominal modifier and the purpose. Many examples are interpreted to be within the NP and not counted as purpose clauses, e.g. *I had [scarcely enough drinking water* to *last a week], If you would have [the kindness to think of my needs], The little prince looked everywhere to find [a place* to *sit down]*. Although some of them are paraphraseable with *in order to,* they sound stilted. These examples may be readily paraphrased with a relative clause, e.g. *scarcely enough water [*that *would last a week]*. Other examples, a smaller number, are counted as purpose, e.g, *All the stars will pour out fresh water* for *me* to *drink, She has four thorns, of no use at all,* to *protect herself against all the world.* Since the purpose marker has come to be used as an infinitive (Haspelmath 1989), it may not be surprising to see this type of gradation and ambiguity; some may have gone through a more radical change to be devoid of purposive idea while others still retain it.

[3] Less common (and less grammaticalized?) expressions, some of them requiring gerunds, are excluded from this study: e.g. *on purpose that, to the end that, for the purpose of, for the sake of, with the view of, with intent to, with the aim of, out of a desire of.*

[4] Not included in the table are two examples with the negative purpose marker *lest* (*we have to call on the concept of norm lest we get forced into...*), and one with *so as to* (used in a direct quotation: *They are simply elements in a system of representation... so as to enable us to...*).

[5] Apparently the conjunction *so* may also express purpose by itself, rather than result (e.g. *Let my people go into the desert,* so *they* can *honor me,* Ex. 5:1, Contemporary English Version). My interpretation of it as purpose might be strongly affected by the modal *can.* In this study, I didn't include *so* as a possible conjunction for purpose. Neither is *such that* included here which can be more colloquial in use.

[6] *-lye* indicates a closer connection to the final verb than *-lyeko* and is directly followed by another verb in close-knit relation, e.g. *-lye ayssu* 'try to' and *-lye ha* 'be about to'.

[7] Choi (1971) does not include this as a purpose connective; he, in fact, lists only *-le* as purpose, and *-lye* as intention.

[8] Yong-Kun Ko (p.c.), in his extensive study of middle Korean, confirms that these benefactive and purpose forms are historically derived from the verb. Although no diachronic study is done, *-le* might also be from a combination of *-lo* (allative) and *-e* (the minimal clause connector as in a serial construction).

[9] Haspelmath (1995:38–9) also gives similar examples: e.g. *consider* (verb) → considering *her age* (preposition) → considering *that she is rather young* (conjunction).

[10] When *nun* is attached to the purpose clause with these other forms, it functions, not to topicalize the clause, but to delimit the scope of negation of the main verb which is obligatorily in negative form with *nun*.

[11] Many languages have distinct syntax for purpose clauses with SS vs DS as the main clause (Thompson and Longacre 1985:187–88). SS purpose clauses may be marked by an infintive, a volitive form, a future tense form, or a special form.

[12] Similar functional distributions are observed for other types of adverbial clause between preposed and postposed clauses (Ford 1993, Hwang 1994a and 1994b, Ramsay 1987).

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LOOKING AND NOTICING AS CULTURALLY SPECIFIC BEHAVIOR

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CHILDREN* have a vast capacity to build networks of interconnected symbol systems. The goal of the research reported here is to develop a systematic method for studying one aspect of children's enculturation in the nonverbal domain. The study investigates how humans utilize the possibility of seeking information visually in naturally occurring situations and how these patterns are exhibited in a child's early years. It explores how young children ages 6 months to 3 years seek that information in their daily lives, and through analysis of in situ observations it develops a preliminary system for plotting the attributes of visual, information-seeking behavior. To date, six categories have emerged from the first two years of this long-term study that is being carried out in two vastly different cultures—China and the United States.

Although this research may seem far removed from linguistic theory and analysis, it draws from and utilizes Lamb's linguistic models and relies heavily on the theoretical and descriptive work Halliday employed while studying his son's rudimentary linguistic functions which began as nonverbal gestures. By investigating nonverbal communicative interactions and behaviors of very young children the study seeks to provide a foundation for linguistic study.

DATA DESCRIPTION. I have used observation and detailed analysis to uncover components of enculturation found in the behaviors of looking and noticing. I began with open-ended observing of children in China as they looked at their worlds and interacted with adults within that visual processing framework. Using this as a foundation I continued my looking in the United States, and a cyclical process of observation, analysis, cross-check, and new observations has evolved. Over the last two years I have collected 151 observations of visual, information-seeking behavior in 6 geographical locations in China, and 33 observations to date in the United States.[1] They have been collected in diverse settings—in trains, on the streets, in classrooms, in parks and zoos, and in homes. These observations were recorded in field notes and supplemented by photos and diagrams. Each has been analyzed for categories. Emerging attributes have been checked and reshaped through focused observations and by cross-checks with cultural insiders and other researchers.

A few specific examples will illustrate the nature of the data.

U. S. SAMPLE OBSERVATIONS.

- A three-year-old boy stood on a small slope of bare dirt and scraggly grass beside the sidewalk. His mother was sitting nearby on a park bench with lunch sandwiches and drinks spread out. He looked intently at a spot on the slope for about 5 seconds, then walked up the slope and back down while looking in the same place. Stepping onto the sidewalk, he walked away a few feet, then returned to look again at the little patch of ground. He stepped onto the slope again, then walked away from it, but looked back over his shoulder. Next he moved down the sidewalk a few feet, went back to look again, then walked up and down the slope again. His interest seemed to be on approximately the same spot at each look, but his body and his location shifted constantly. He went back to his mother, collected a bite of sandwich and returned to the same spot. The entire observation was about 4 minutes long. [US #28]

- A nine-month-old girl was sitting in her stroller at the chimpanzee area of the zoo. Her parents and older siblings were leaning against the fence with many other spectators watching a chimpanzee family. The baby's stroller was parked behind them. She could see none of the animal display, but she was content to look at things in her environment and pull herself up on the fence. I was able to watch her eyes, and typical spurts of looking included the following: 3 seconds at her father's leg, 4 up at a tree, then 1 second at her father's shorts. After looking about rapidly for awhile she looked back at her father's shorts for 3 seconds, at me for 4, and then at the ground for 12 seconds. Next she looked straight ahead (when I could not see her eyes), but her head moved every 2 seconds, 2 seconds, 2 seconds, 2 seconds shifting about 10 degrees each time. She then leaned forward toward the chain link fence and focused at different points on it for 2, 2, 1 and then 3 seconds. During the three-second look she pulled herself up on the fence with both hands. This looking-pulling-up sequence was repeated several times. Her parents then turned toward her and pushed her on to the next area. The observation was 5 minutes long. [US #20]

CHINESE SAMPLE OBSERVATIONS

- A two-year-old stood beside a large patch of golden wheat, while his father waited off to one side. The child pulled up one wheat stalk and looked at it intently. He then looked at the wheat beyond, leaned forward a little and pulled up a second stalk. Holding one stalk in each hand, with the heads of wheat almost at eye level, he looked at the head of one, then the other, back and forth, back and forth. At three different times within 7 minutes the child made long looks, focused on the heads of wheat. The first extended for 35 seconds, the second for 25 seconds, and the third for 45 seconds. In between these long looking periods there were very brief looks to the side, but he never moved his feet and his hands were almost stationary. At one point, between the second and third long looks, his father took a piece of twine that was tied into a circle about 5 feet in diameter, draped it around the child like a harness, and tried to pull him away gently. The child slid out of the twine, returned to his original place and continued looking at the stalks in his hand, from one to the other. The father returned to his waiting position on the side. This portion of the observation was about 7 minutes long. [CH #55]

- An 18-month-old child was standing on a park bench beside where her mother was seated. For 5 minutes they looked at various activities in the park, stylized sword dances, the people passing by, the flowers. Then the mother got out a bag of commercial nibble snacks, a small type of popcorn in a foil bag, and for the next 15 minutes a looking game proceeded. The mother slipped one piece of popcorn to the top of the bag opening. As it emerged, the child took it while they both peered at it carefully, and then she ate it. The mother slowly pushed one more piece to the top of the bag, they peered at it, and the baby took it and gave it to her mother. This activity continued—the child took a piece, they both looked at it for 5 seconds, and then the child ate it. Five minutes into the game, the baby sat down for 6 seconds. She then stood back up and the game continued as before, after she had looked into the bag for 11 seconds. At one point a piece popped out of the bag about 2 inches; the baby and her mother caught it together; they both smiled and then the baby ate it. This interaction continued for 15 minutes before another activity was introduced. [CH #16]

These are just a few of the observations, but they give a flavor of the data. Although they may appear commonplace and trivial at face value, they are rich in complexity of sign systems when combined with other observations and analyzed for similarities and contrasts.

RESEARCH OVERVIEW AND THEORY. By identifying characteristics of young children's looking behavior in two very different cultures, a system can be built that encompasses a wide range of sign system potential. A culture's information system is a cohesive interlocking reality, and learned networks of relationships shape a child's output at many points. Lamb sheds light on this complexity through his descriptive work of systems of networks and their nonlinear nature. His models suggest a dynamic, interconnected world (Lamb 1993; Regan 1989) in which any part of a culture is connected to all the rest. Such multidimensional systems preclude simplistic, linear models of explanation or leaps from discrete unit to whole cultural meanings. They also present a dilemma for this study, for they suggest that complex interconnections exist between language production systems and nonverbal activity. At the same time, Lamb's models caution against leaping to premature conclusions. In the case of this research, one premature conclusion would be that the visual behavior being studied develops in parallel to language. Meticulous observation and description of visual information-seeking behavior in young children must precede any hypothesis building processes.

In spite of this cautionary stance, the notion of communicative competence appears to provide one potential link. Significant portions of communication sign systems are associated with socially appropriate and culturally specific competence. Hymes describes this communicative competence as what a 'member of a society knows in knowing how to participate' (1970:66). In the relatively undefined nonverbal domain of visual interactions, communicative competence involves such things as how to look someone in the face, how long to stare at an object in another person's hand, or how close to come to an object being viewed. Cultural clustering within categories of this study already suggest that culturally specific ways of looking may exist.

Connections between the nonverbal and the structure and form of language acquisition are more tenuous and need to remain so at this point. A few threads exist but must be viewed cautiously. A small body of research that considers nonverbal participant structures as possible precursors to linguistic interactions (see for example Philips 1993; Trevarthan 1979) has considered whether infants produce unspoken communicative components that include rudiments of speech. Evidence is inconclusive, but these studies as well as earlier language acquisition work (e.g., Brown 1973; McNeill 1966) see children treating one-word utterances as a system. This in turn raises questions as to whether children view nonverbal 'acts' as a communicative system. Stronger potential links to visual behavior appear in recent work of Armstrong, Stokoe, and Wilcox (1995) who have drawn on primatology, linguistics and their intimate knowledge of sign languages of deaf communities to suggest that language emerges through visible bodily action.

To date the most helpful research is Halliday's careful description and analysis of his son's earliest linguistic functions (1975; 1979). He demonstrates that by nine months of age, long before using conventional words, Nigel employed nonverbal means to express linguistic function. Halliday defines the 'acts of meaning' that Nigel used in his protolanguage as communicative acts that are both intentional and symbolic. They included three nonverbal signs and two 'vocal gestures' (not words).

	Meaning	**Expression**
(i)	'I want that'	grasp object momentarily, then let go
(ii)	'I don't want that'	touch object lightly and momentarily
(iii)	'do something with that or me to watch'	touch object firmly for measurable time
(iv)	'let's be together'	half close front rounded vowel on low falling tone
(v)	'that's interesting'	half close front rounded vowel on mid falling tone

(Halliday, 1979:173)

He identifies this set of symbolic acts as semantic functions. The first three, those most relevant to this study, are in the active mode of semantic development. Function (i) is 'instrumental' with Nigel using nonverbal gestures (and later in his development, verbal gestures) to get what he wants. Function (ii), the 'regulatory', is also in the active or pragmatic mode and is person oriented—the meaning being 'you do this'. Function (iii) is more 'interactional' with Nigel using 'nonverbal language' as a way of being together with another person. These functions continue into his early speech. Halliday postulates that one common element in all protolanguage is that its elements are discrete signs, but they are somewhat different from those found in adult language; it consists of a semantics and a phonology (or other expressive means), but no lexicogrammar (1979:180).

Halliday's findings may—or may not—provide a way to link the data of this study to language development, but they point toward a fruitful area of exploration. Several related questions and puzzles must be considered as the research proceeds, however. First, Halliday studied one case of a child's nonverbal behavior as it connected to emergent language, while I am creating a system in which all acts of a semiotic mode can be recorded. In doing this, I hope to set a foundation for what will follow linguistically, but it places my work in a very different context from Halliday's. Secondly, I must question whether visual nonverbal behavior is entwined with language development or whether it functions separately. And if it *is* closely connected, then does it actually function similarly to speech?

FIRST PHASE CATEGORIES—A SYSTEM EMERGING. Since the ultimate task of this research is to create categories that will help define units and inner structures within and among cultures, one other central issue needs exploration—how to categorize and systematize visual information-seeking behavior. Regan points out that deciding what is a 'unit' is one of the most difficult questions in observational research (1987; Regan et al., in press). The first phase approximations that have emerged from the current array of data are rough and very imperfect. When observing very young children in naturally occurring situations, the possibility of defining likeness between one event and the next is problematic, even within the same culture. Comparing events across cultures becomes even more complex.

Following are first phase approximations that have emerged from this study of attributes of visual information-seeking behavior. The array of data—although highly complex—is merely a beginning point when considered within the context of interconnected systems. Nevertheless, these first phase categories provide a foundation for more focused observation and testing. In addition, they help identify culturally specific patterns of semiotic development and ways of knowing that have evolved in particular cultures, but not necessarily in others.

Six categories have emerged from analysis of the 184 observations of young children's looking and noticing behavior in the two cultures. As rough as they are, they have held constant as new observations have been added.

- Duration of looking: how long a young child looks continuously at one thing (exhibited either by eye or head fixations)
- Duration of an entire looking event or activity: how long a looking activity is sustained with a single focus, despite minor distractions or interruptions
- Nature of focus: for example, steady, jerky, visually locked on a subject, panning, zooming
- Size of the object of focus
- Movement of the body while looking: for example, hands, head, whole body; speed of movement
- Adult indicating behavior: pointing; moving to the eye level of the child; holding the child in a particular position

By applying some of these categories to the four sample observations described above, we get the following:

DURATION OF LOOKING.

US #28 For the three-year-old boy looking at something as he moved up and down and near the little slope, each look at the focal point was 5 seconds or less.

US #20 The longest look for the nine-month-old at the zoo was 12 seconds, and the average of the 14 recorded looks or fixations was 3.07 seconds.

CH #55 For the Chinese two-year-old looking at the heads of wheat, there were three recorded lengthy and sustained looks of 35, 25 and 45 seconds respectively as well as unrecorded looking in between, much of which was focused on the wheat.

CH #16 Only two specific look times (of 11 and 5 seconds) were recorded for the 18-month-old playing the popcorn game with her mother, because the observation was focused on the interplay between mother and daughter rather than on duration of a single look.

Even in this seemingly simplistic category, the variety is complex—as it should be, and differences or extremes within an event may be more productive to look at than means or totals.

DURATION OF AN ENTIRE LOOKING EVENT OR ACTIVITY.

US #28 The US three-year-old on the little slope sustained one specific focus point throughout a 5-minute time frame, but he was constantly changing his physical location and subsequently the direction of his look—even to the point of going many feet away to a get a bite of sandwich and then returning.

US #20 During the 5 minutes of observation of this nine month old, her focus on any one thing was very brief—an average of 3.07 seconds. But her sustained interest of sitting in her stroller and 'just noticing' was continuous even while she was pulling herself up on the fence.

CH #55 For the two-year-old with the wheat, the entire looking activity filled up a 7-minute time frame. The child himself never interrupted the looking activity during the 7 minutes. When his father tried to interrupt with the twine, the child ignored him and sustained his focus on the wheat.

CH #16 Duration of the popcorn game between the mother and her 18-month-old daughter was 15 minutes with only one 6-second break when the child sat down. However, this is the only observation of the four examples that includes the intimate involvement of a parent. This parent involvement adds another factor which may structure looking behavior differently.

PRELIMINARY PATTERNS OF CULTURALLY SPECIFIC BEHAVIOR. Although culturally specific patterns must be defined carefully at all times and be allowed to develop more fully, or dissolve, as more data are collected, there is some clustering of attributes when observations from China and the United States are placed side by side.

DURATION OF LOOKING. The length of a single gaze appears to have a shorter time span among US children than among Chinese children. In the US data, of a total of 22 observations that record duration of looking in seconds, 5 include looks of 15 seconds or longer, with the longest two at 45 and 50 sec-

Age/Case#	United States	Age/Case	China
1;0/#23	1 2 2 2 1 2 1 2 1 1 2 2 1 3 4 2 3	1;0/#54	1 5 2 8 5 7 10 12 1 2 1 6
1;3/#9	1 2 1 2 1 2	1;3/#79	10 25 14 3 8 8 2 5 8 4 10 5 4 4 6 10
1;6/#16	1 2 1 3 9 1 2 1 4 9 1	1;6/#5	2 3 2 3
1;9/#26	7 2 5 5 2 5	[1;8]/#86	2 5 1 6 1 2
2;0/#7	8 1 8 2 10 2	[1;10]/#84	3 2 6 1 1 3 6 2 9 4 17
[2;0]/#8	5 2 1 3 2 4	2;6/#51	31 2 3 1 10
3;0/#19	1 2 4 1 8 6 1 2 1 15	3;0/#80	14 3 12 6 10 2 2 8 5
3;/#1	2 2 1 2 1 1 6 2 3 1 2 1 1 1 1 1 1	3;6/#27	5 1 6

Table 1. Duration of Looking: Sequence Patterns: Reported in seconds. The children included in the table were randomly selected from within age groupings. Age is reported by year and month—1;3 is one year, three months.

onds. In the Chinese data, of a total of 37 observations that record duration of looking, 16 single gazes are recorded of 15 seconds or more. These involved 9 different children, and the longest were 55 and 65 seconds.

In another subset of data—sequence patterns of a child looking at one focal point, then the next, and the next—the US observations document numerous rapid sequences. Typical patterns can be seen in Table 1.

There is of course considerable variation among the sequences of each cultural group, with one four year old in the United States looking intently at the flamingoes in the zoo for 50 seconds, without moving her eyes. Some Chinese youngsters, on the other hand, looked from one thing to the next with only a few seconds allowed for each fixed gaze. Nonetheless, when sequence patterns are lined up side by side as in Table 1, the data show US children having many more incidents of 1 and 2 second looks in their sequences. Of the 29 observations in China where head fixations or eye gazes were recorded, the data often yielded a look of 8 to 10 seconds or more embedded in a series of shorter ones. Only more systematically collected data will delineate cultural differences, or likenesses, in this category.

ADULT INDICATING BEHAVIOR. Much indicating and showing is done unconsciously by the adult, but repeated patterns of behavior can send a persistent message to a child that 'this is the way we look at things around here'. When hundreds of repetitions are experienced day in and day out, patterns of cultural networks are formed. Vygotsky concluded that as sign use develops it leads humans to a specific structure of behavior that 'creates new forms of a culturally-based psychological process' (1978:40). Daily interactions associated with visual information-seeking behavior are influenced and shaped by complex webs of culturally specific sign systems that perfuse daily life. 'The microsemiotic exchanges of family and peer group life', writes Halliday, 'contain within themselves indices of the most pervasive semiotic patterns of the culture' (1975:81).

One subset of culturally specific behavior—how adults carry young children—emerged within this category of adult indicating behavior early in the study. With a high level of consistency, Chinese adults carry young children so that the child has the opportunity to see the same visual perspective as the adult (Figure 1). Of 77 carrying position observations in China, 74 children were held in this almost identical manner, while the other three (all asleep) were held diagonally across the adult's abdomen. Of the 44 observations made so far in the United States no such consistency exists. A variety of 9 holding positions have emerged so far in the US data. They vary from high on the hip with the child looking in a number of directions to cloth carriers where the child's face is against the adult's chest.

As the research continues, more subsets of this nature may emerge that will help define other categories.

FUTURE CONSIDERATIONS. Precautions need to be taken into consideration when looking at categories in isolation. In reality, the categories are entwined into complex networks. Although it is convenient to look at them as separate entities, they actually coexist and are inseparable. In some instances, this complexity appears to add dimension to cultural differences. For example, Chinese children seem to combine longer single gazes with less body movement, while children in the United States seem to combine much more movement with quicker single gazes. On the other hand, multidimensionality may erase some cultural differences.

Another consideration is that as new categories and insights are discovered in one culture, it is critical to dip back into another culture to see what exists, or does not exist there. The long duration of individual gazes and of looking activities in China forced me to see duration of gazes and activities in the United States in a completely new light. And I believe that the recent discovery of movement patterns within looking activities in the United States will most likely help me see new patterns in China.

After much more data are collected, links between this data of visual information-seeking behavior and language development must be probed with great care. *The Handbook of Semiotics,* citing Pike's unified theory of human behavior as 'the most important contribution of linguistics to the study of nonverbal communication' (Nöth 1995:388), points out that semioticians consider nonverbal communication the field most closely connected with verbal behavior and seek to extend linguistic research into the study of signs. Although this research may eventually provide a means for exploring such connections, Lamb's warnings against leaping to conclusions must be listened to carefully. At present the realm of this study remains the careful description and delineation of categories that emerge from naturally occurring observations.

The long-term purpose of this research is to discover areas of human potential. The human capacity to develop any number of semiotic systems can be demonstrated as careful description and analysis illuminate the unique ways that diverse cultures have evolved. Contrast found in two highly distinct cultures forces reexamination of the familiar, and this juxtaposition illuminates new possibilities. Cultures, because they develop such different characteristics and perspectives, provide us with ways of looking that we could not imagine if we did not step outside of our own ethnocentric perspective.

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[1] A subset of one category, carrying positions, emerged early in data collection and an additional 177 Chinese and, to date, 44 U.S. observations have also been made of this behavior.

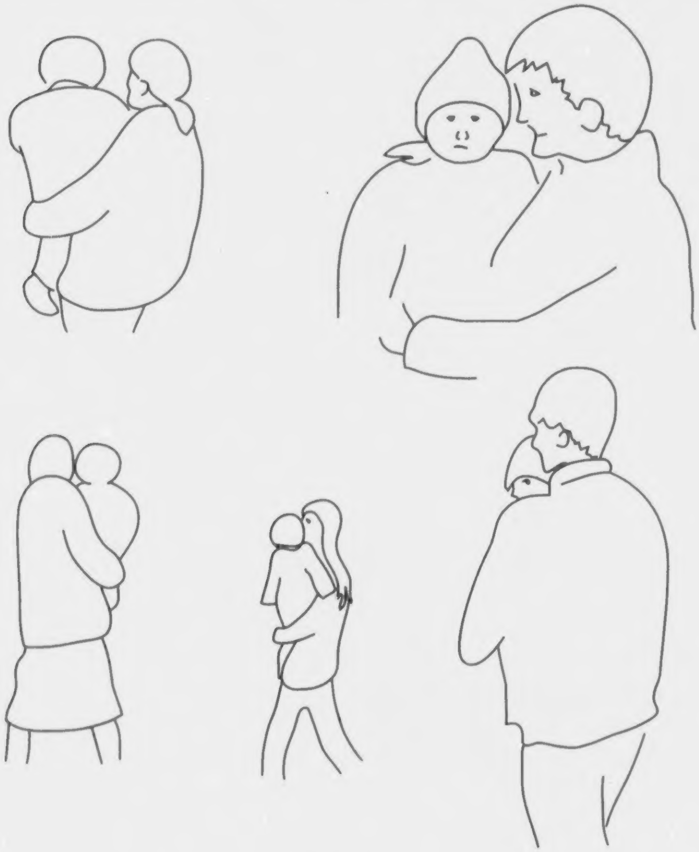

Figure 1. Adult indicating behavior: carrying positions, China. Traced from representative photos taken in China, ages 6 months to 3 years.

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THE ACQUISITION OF ASPECT IN PAST TENSE FRENCH AMONG L2 CLASSROOM LEARNERS

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1. Introduction. Aspect is the relation between a situation and its associated interval on the time line (Comrie 1976). Aspect, unlike tense, is not a deictic category because it is not relative to the time of the utterance (but see Klein 1994 for an alternative position). Comrie points out that aspect is concerned with the situation-internal time, whereas tense is relative to situation-external time (1976:5). Aspectual distinctions can be marked explicitly (grammatical aspect) or not (inherent aspect). The inherent lexical meaning of the verb (general semantic definition of aspect) is determined by the temporal features intrinsic in the semantics of the predicate in its unmarked, lexical form. Vendler (1967) has proposed a classification of verbs into four different types according to their inherent semantic values. Andersen (1986, 1989, 1991) has adapted that classification for the study of the development of Second Language Acquisition (SLA): (1) states (lasts indefinitely); (2) activities (arbitrary beginning and end point: process); (3) accomplishments (inherent end point: durative); and (4) achievements (inherent end point, but no duration: momentaneous/punctual).

In spite of their inherent semantic value, verbs can be overtly marked: grammatical aspect. Grammatical aspect is obligatorily encoded in the form of auxiliaries plus participles (passé composé), inflectional morphology (imparfait), periphrastics (Progressive), etc. The perfective/imperfective distinction of aspect in the Romance languages is a clear example of grammatical aspect. In French, the perfective (passé composé) presents the temporal situation as a single unanalyzable whole, with beginning, middle and end together, whereas the imperfective (imparfait) presents the internal temporal structure of the same situation (Comrie 1976). Waugh (1990) argues that the unmarked aspect form in past tense French is imparfait. However, for the purpose of this study, the unmarked value of past tense aspect in French will be determined in accordance with language acquisition constraints. Grammatical aspect alters the inherent semantic contour of each verb (Ramsay 1990:138). The unmarked value is determined by cases when the inherent semantic value of the verb and the grammatical encoding of aspect coincide: no competition (Andersen's congruence principle). The marked value is represented by the case when the aspectual inflection is in direct contradiction with lexical aspect (it requires more cognitive processing).

Andersen and Shirai (1994) argue that the appropriate use of tense/aspect markers will be determined by the combined effects of discourse constraints and the aspect hypothesis: speakers will use perfective or imperfective aspect depending on the type of verb used (state, activity, accomplishment, or achievement) and the particular discourse-pragmatics of the target language. The aspect hypothesis is based on the assumption that there is a communicative need to distinguish completed events (achievements and accomplishments) from simultaneous processes (activities) and both from static background (imperfective marking and past habituals). In other words, the use of imparfait and passé composé will not be balanced across verbs: some verbs will be associated with one marker of grammatical aspect more than with the other depending on the most typical discourse role they play in language. The obvious corollary of the aspect hypothesis is that there is a natural developmental process (following 'natural' discourse) for the acquisition of aspectual distinctions in the L2. In terms of the distributional bias hypothesis (Andersen 1994; Andersen & Shirai 1994) the type and amount of input data (natural L2 discourse) should also have an impact on the development of aspectual distinctions in the L2: unmarked and marked settings. The sequential development of aspect appears to be determined by the natural use of passé composé/imparfait in normal discourse (contextualized). However, it is not clear why classroom learners would follow the same developmental sequences of natural learners.

2. THE PRESENT STUDY

2.1 HYPOTHESIS. The following assumption was made for this study: classroom learners do not have access to the rich contextualized linguistic environment of 'natural' communicative situations in the target language. The traditional type of academic instruction is likely to distort the normal distribution of occurrences of grammatical aspect in the target language because classroom discourse is not representative of most non-academic discursive environments (Andersen and Shirai's distributional bias hypothesis). As a consequence, the relative weight of occurrences of passé composé/imparfait will be determined by semantico-conceptual universals (relevance principle and congruence principle). This assumption was operationalized in the following hypothesis: English-speaking students learning French in a classroom setting and French native speakers will differ in their use of passé composé/imparfait in the target language. The L2 students will favor the use of inherent semantic aspect (unmarked form).

2.2 SUBJECTS. The subject pool consisted of a total of 69 college students. The nonnative speakers group was represented by 39 English-speaking students enrolled in a second-semester French course (French 122) at Cornell University. The native speakers' group was represented by 30 native speakers of French enrolled in the French teaching program at McGill University. The French 122 students used the textbook *Deux Mondes*, developed by Tracy Terrell. This textbook presents the uses of imparfait and passé composé in 4 out of a total of 12 chapters. In chapter 6 there is a direct reference to the concept of inherent lexical meaning with respect to the likelihood of using imparfait versus passé composé with state verbs, and passé composé with punctual verbs (p. 242). By the time of the study all chapters from *Deux Mondes* had been covered. The weekly workload for the French 122 students included four hours of section with a teaching assistant and one hour of lecture with the coordinator of the course. The 30 native speakers of French taking courses at McGill University participated in the study as the control group. All subjects completed a questionnaire with information about their academic background. The average number of experience with French in high school and college was 1.74 years and 1.66 semesters respectively. The average number of weekly hours devoted to Study French was 3.92. The students were also requested to provide a self-assessment of their participation in the course they were taking as well as an overall assessment of theior proficiency in French. The average scores for course proficiency was 3.66 and for overall proficiency was 2.46.[1]

2.3 MATERIALS AND PROCEDURE. The passage used for the study was an excerpt from the magazine *Paris Match* (an interview). The selected passage contained a high number of uses of both passé composé and imparfait associated with the four types of verbs according to Vendler's analysis, but especially statives and achievement verbs. The unbalanced data set in favor of the latter types was essential to ensure that the students would be exposed to several instances of the marked use of aspect with the prototypical verbs of perfective and imperfective aspect. The distributional bias hypothesis (Andersen & Shirai 1994) establishes that both passé composé and imparfait can be used with any type of verb, although the use of imparfait with achievement verbs, and passé composé with stative verbs are marked (atypical). In spite of that range of marked and unmarked uses of aspect the length of the passage was appropriate for use in regular class time (Appendix A). The original text was not changed except for the addition of the choices of passé composé or imparfait necessary to create a cloze test. There was a total of 41 items. All testing was done with whole classes during regular class hours. The testing of the L2 French students was done in one day, whereas the testing of the native speakers was done in two consecutive days.

The results of the statistical tests are depicted graphically in Figure 1. Figure 1 reveals that (i) both native speakers and nonnative speakers tend to use grammatical aspect (passé composé/imparfait) according to the distribution of inherent semantic aspect, and (ii) native and nonnative speakers coincide in their choice of aspectual marking in all categories. This is especially true for stative and achievement verbs, because the majority of the verbs used in the text are of those types: 18 and 11 tokens respectively (29 out of a total of 41 tokens: approximately 75%). The analysis of the particular items that correspond to each verb type have been presented in graphical form in Figures 2 to 5 (the actual items are presented in Appendix A). A list of all items by aspectual class is summarized in Table 1.

Stative	**Activity**	**Accomplishment**	**Achievement**
2: to be	1: to take place	3: to go	7:to stop (cesser)
4: to have	5: to participate	6: to make	8: to register
10: to want	13: take place	11: to regroup	9: to request
12: to last	22: to learn	29: to scare	14: to question
15: to be	23: to think		20: to choose
16: to have	24: to participate		28: to take resposibility
17: to be	30: to think		31: to find
18: to be	36: to work		32: to request
19: to be			33: to depart
21: to have			37: to stop
25: to be			41: to give
26: to have			
27: be obliged			
34: to be			
35: to stay			
38: to have			
39: to be			

Figure 1. List of verbs from cloze test classified by aspectual class.

The analysis of the results with achievement verbs does not reveal any inconsistencies with the previous analysis. The degree of equivalence in the judgments of both groups for all achievement verbs is quite remarkable (with the exception of item 7). The latter item presents a clear challenge to the FRE 122 students because the nonnative speakers' scores for this item fall in the middle range of the graph of proportions passé composé/imparfait (around the 0.5 value). The scores falling on the 0.5 value range represent an ambivalence of judgment: they reveal that the subjects are not sure about the grammatical aspect associated with those verbs in their contexts. In this re-

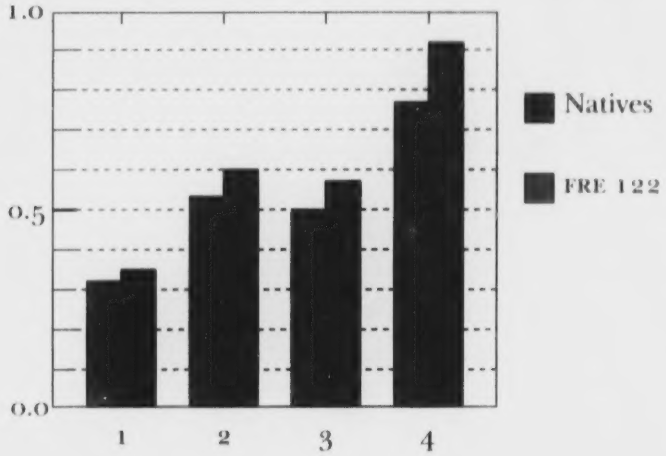

Figure 1. Distribution of passé composé/imparfait in the grammaticality judgment task by group (proportions)

spect, notice that none of the scores of the native speakers (achievement verbs) falls in the 'uncertainty range' of 0.5. On the other hand, both native speakers and nonnative speakers' judgments show a strong tendency to favor the unmarked form with achievement verbs (passé composé); none of the items show any significant support for the marked form (imparfait). This is an

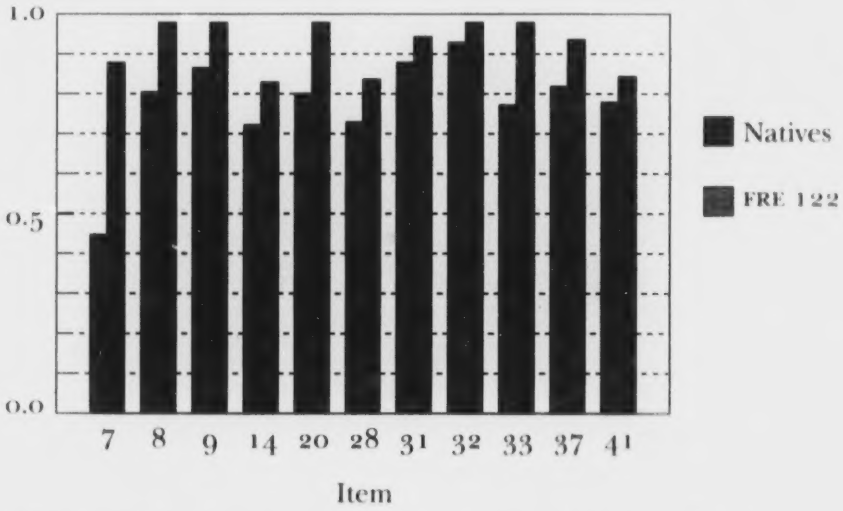

Figure 2. Distribution of use of passé composé/imparfait for achievement verbs per individual item.

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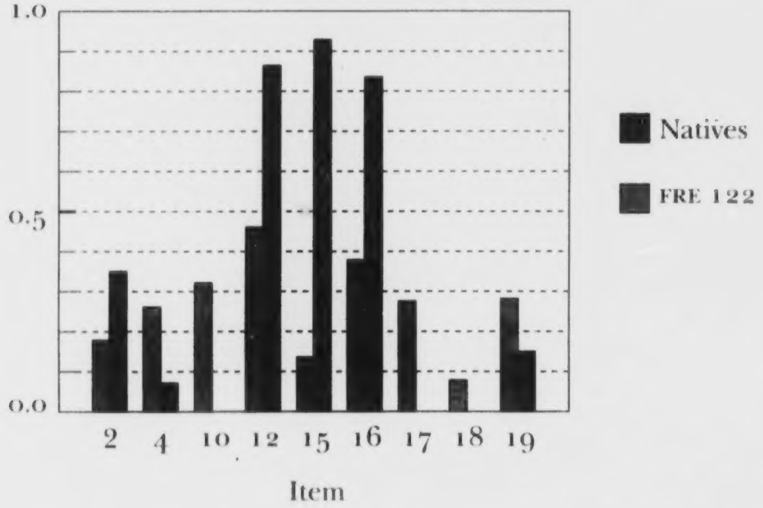

Figure 3. Distribution of use of passé composé/imparfait for state verbs per individual item.

expected outcome if the sole criterion that subjects use in their judgment in the selection of overt aspectual marking is done according to the inherent semantic aspect of the verb.

The analysis of the results for stative verbs (Figures 3 and 3A) presents a clearly distinct picture from the one for achievement verbs. The judgments of native and nonnative speakers do not coincide in several cases. In general, the FRE 122 students show a strong tendency to use imparfait (unmarked form) with state verbs in close adherence to the value of the inherent semantic aspect of these verbs. This tendency is quite apparent in several items where the native speakers clearly preferred the marked form (passé composé): 12, 15, 16, 38, and 40. The only item which contradicts the above mentioned tendency is item 35 (where native speakers strongly preferred the unmarked case)[2]. Finally, notice that items 26 and 27 show a close parallel in the native and nonnative speakers' selection of aspectual marking: all scores fall on the uncertainty range of 0.5. It seems that—only with these two items—either aspectual marker is appropriate judging by the fact that native speakers' scores fall on the ambiguity range of 0.5 as well.

The results for accomplishment verbs are presented in Figure 4. The few items which belong to this category do not warrant an extended analysis. However, notice that nonnative speakers preferred the marked setting for item 29 (*faire peur* 'to scare'). The results for activity verbs are presented in Figure 5. Two of the most conspicuous items are numbers 23 and 30: both items are tokens of the verb *penser* 'to think'. It is difficult to hypothesize the reason for the consistent outcome of this verb according to inherent aspect

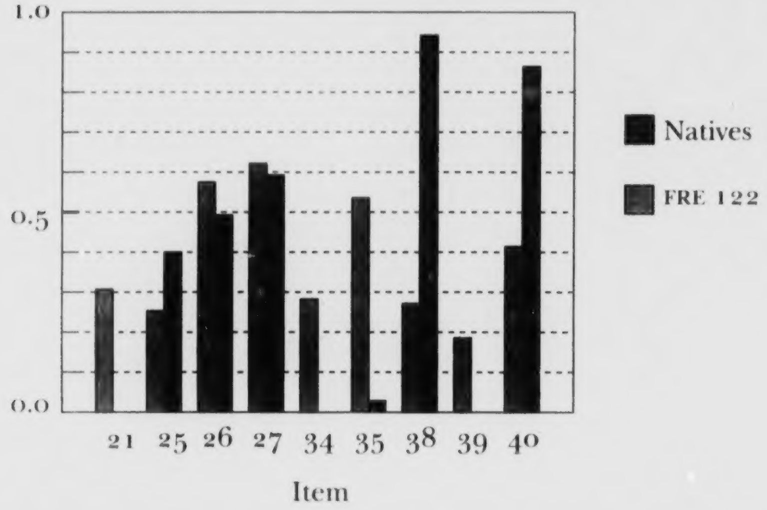

Figure 3A. Distribution of use of passé composé/imparfait for state verbs per individual item.

alone. However, the analysis from a narrativity perspective (see discussion section) may provide a tentative answer on this respect. For example, data from a previous study of English speaking learners of L2 French—Salaberry (1996)—show that the verb *penser* is likely to become part of the foreground of the narrative text (high focus); thereby, being used as a marked form (atelic verb).

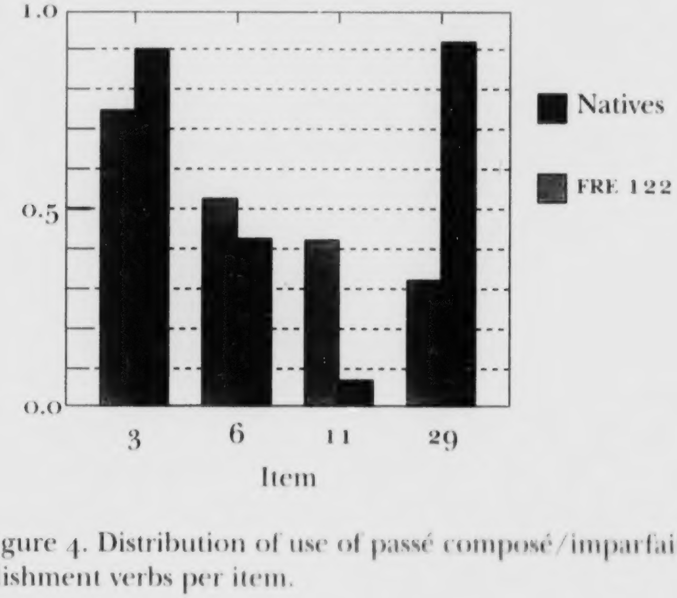

Figure 4. Distribution of use of passé composé/imparfait for accomplishment verbs per item.

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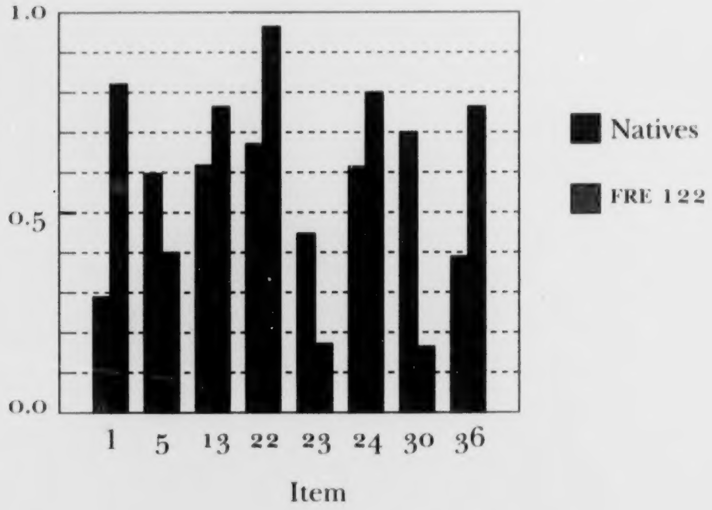

Figure 5. Distribution of use of passé composé/imparfait for activity verbs per item.

4. Discussion. Nonnative speakers seem to differ from native speakers in the *marked choice* of grammatical aspect in L2 French. However the FRE 122 students are able to select the unmarked setting (inherent semantic aspect) in ways that parallel the results of native speakers. How can we explain the fact that learners will expand a one-to-one system (congruence of the lexical semantic value of predicate and associated arguments with given grammatical marker) to a more complex one which must incorporate discursive-pragmatic factors which are language-dependent? The data from natural language learners such as Anthony (Andersen 1986, 1991) may present a gradual spread of the unmarked forms towards the marked ones because natural learners are actually building the system of past tense aspect (both marked and unmarked forms) in a (highly) contextualized linguistic environment. On the other hand, the FRE 122 students have access only to 'bits and pieces' of the discursive space of the target language: the spread of passé composé/imparfait forms from unmarked to marked forms will occur in a more fluctuating fashion. However, in spite of the scanty access to natural language data, it is clear that the FRE 122 students have achieved a fair degree of aptitude to use the system of aspectual distinctions in L2 French (unmarked form) as shown in the previous analysis of the data (see especially Figure 1). That is to say, FRE 122 students are not successful with the marked forms because they have not had enough access to the type of non-classroom discourse that will help them recognize when to reject the unmarked form of aspect in favor of the marked form.

Notice that 'ultimate attainment' (the native-like use of the target grammatical item) will be represented by the appropriate use of both aspectual markers with each verb (see Birdsong for a theoretical and empirical analysis of ultimate attainment in L2 acquisition). Ellis (1989) reports that during the beginning stages of acquisition of L2 English past tense nonnative speakers mark the past tense of the verb to go with both the present and the past tense forms (go and went). In a subsequent stage, students discard the incorrect option (go) in favor of the correct one (went). In the case of L2 French, we can see that the developmental sequence of past tense aspect reflects the opposite trend: from a first stage where a single marker of aspect associated with the inherent semantic value of the verb constellation is used, the learner must be able to incorporate two distinct markers of past tense aspect to their interlanguage (point of view aspect determines the use of imparfait or passé composé). In sum, the aspect hypothesis (the relevance principle and the congruence principle) can only predict the behavior of the learner up to the point when the student is using one single marker per verb.

In this respect, notice that the recent account offered by Andersen and Shirai (1994) about the development of aspectual distinctions in L2 learning points exactly in the direction of discursive-pragmatic factors as the ultimate determinant of the acquisition of aspect in the L2. Andersen and Shirai argue that the Relevance Principle (aspect is more relevant to the meaning of the verb than tense, mood or agreement) and the Congruence Principle (learners choose the morpheme whose aspectual meaning is most congruent with the aspectual meaning of the verb) 'are especially sensitive to discourse-pragmatic function. Verbs and inflections are chosen to fulfill the needs of the speaker in ongoing discourse...' (p. 147). I would argue that the distributional bias of Andersen and Shirai comes from the communicative intentions of the speaker, and not necessarily the particular semantic features of grammatical aspect. Furthermore, the nature of communication is inherently tied to cultural conventions—and so is the choice of the marked values of aspect. As Binnick (1991) puts it 'the problem comes when we try to understand what it is that the speaker of a language with aspectual oppositions knows which a nonspeaker does not know, and consider how to model this knowledge in the grammar' (p. 209). On this point, it should be considered that

> 'Gestalt theory makes strong claims about universal innate perceptual mechanisms, *while acquired individual, social, and cultural dispositions clearly play a role in determining, among other things, perceived figures and grounds.* The implications of such factors for the organization of language are profound, as in, for example, the difference in viewpoint or orientation...' (Wallace 1982:217, emphasis added).

In sum, I have argued that the system of aspectual distinctions developed by the FRE 122 students who participated in this study should not be measured according to the developmental stages representative of natural language learners (e.g. Andersen 1986, 1991). The discrepancies between native and nonnative speakers' judgments may be reasonably attributed to the particular effect of both unmarked (semantico-conceptual) and marked (pragmatic) aspectual choices. Furthermore, it is reasonable to assume that the development of the marked values of past tense aspect in L2 French are much harder to learn to the effect that point of view aspect is much more language and culture dependent than the basic semantic distinctions instantiated in the inherent lexical meanings.

5. Conclusion. This paper has shown that an extended degree of exposure to various discourse environments in the L2 would allow learners to go beyond the basic level of use of grammatical aspect (unmarked value) and extend its use to all types of environments independent of inherent lexical meaning of the verb. The results of this investigation need to be confirmed with additional evidence from empirical studies that include other modes of data collection (e.g., oral versus written data), the comparison of different types of discourse (e.g., cloze test versus narratives), and the correlated analysis of the same data from alternative theoretical perspectives (e.g., a narrative perspective using the foreground/background distinction).

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[1] The self-rating procedure of assesment is only intended as a rough measurement of thier perceived ability in the target language. In this respect the inclusion of the self-rating for both course and general proficiency may be more informative that just one measurement.

[2] What is noticeable about this item is that it is the only verb in this text which is accompanied by an auxiliary: *devoir rester* 'must stay'. Whether this factor alone may explain the fact that nonnative did not follow the otherwise clear tendency to mark stative verbs with the unmarked form (imparfait) with this item alone remains an open question.

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APPENDIX A

EXERCISE 1—Time: 12 minutes

Question: Comment **1** (*s'est déroulée / se déroulait*) votre jeunesse dans votre petite ville?

Réponse: **2** (*J'étais / J'ai été*) lycéenne et **3** (*j'allais / je suis allée*) jusqu'au baccalauréat, option latin-grec, car **4** (*j'avais / j'ai eu*) le goût des études classiques. En même temps, **5** (*je participais / j'ai participé*) à des défilés de mode. **6** (*Je faisais / J'ai fait*) des concours de mannequins, de photos, mais je **7** (*ne cessais jamais / n'ai jamais cessé*) d'étudier. A 17 ans je **8** (*je m'inscrivais / je me suis inscrite*) en fac de droit. Là, les organisateurs de Miss World University **9** (*me demandaient / m'ont demandé*) de représenter mon pays à ce concours. Ils **10** (*ne voulaient pas / n'ont pas voulu*) seulement des filles belles, mais ayant aussi la tête bien faite. Le concours qui **11** (*ne regroupait / n'a regroupé*) que des étudiants, **12** (*durait / a duré*) trois semaines et **13** (*se déroulait / s'est déroulé*) à Séoul, en Corée. J'ai été élue. Au départ, il était organisé sous l'égide des Nations Unies. Pour tester notre culture on nous **14** (*interrogeait / a interrogées*) sur des sujets divers, sur les problèmes du monde… Quel que soit le concours, la beauté **15** (*n'était jamais / n'a jamais été*) ma motivation première. Or **16** (*j'avais toujours / j'ai toujours eu*) soif d'apprendre.

Q: **17** (*Etiez-vous / Avez-vous été*) studieuse?

R: **18** (*J'étais / J'ai été*) très bonne élève. Outre le latin et le grec, **19** (*Je me passionnais / Je me suis passionnée*) pour le français, et l'anglais.

Q: Pourquoi **20** (*choisisiez-vous / avez-vous choisi*) le droit?

R: Parce que **21** (*j'avais / j'ai eu*) l'ambition d'entrer dans une grande organisation internationale, l'Onu, l'Unesco… C'est d'ailleurs la raison pour laquelle **22** (*j'apprenais / j'ai appris*) plusieurs langues. **23** (*Je pensais / J'ai pensé*) pouvoir jouer un rôle d'ambassadrice au service d'une organisation, d'un parti politique, ou d'un pays. Si **24** (*je participais / j'ai participé*) à tant de concours depuis l'âge de 15 ans, **25** (*c'était / ça a été*) pour financer mes études. **26** (*Je n'avais pas / Je n'ai pas eu*) de bourse et **27** (*j'étais obligée / j'ai été obligée*) de me débrouiller. Je suis consciencieuse et **28** (*j'assumais / j'ai assumé*) mon choix sans sacrifier les études. Travailler ne **29** (*me faisait jamais / m'a jamais fait*) peur

Q: En arrivant à Paris **30** (*pensiez-vous / avez-vous pensé*) faire une carrière de mannequin?

R: Pas du tout. Un "talent scout" **31** (*me rencontrait / m'a rencontrée*) aux Pays Bas et **32** (*me demandait / m'a demandé*) de venir faire un essai de quelques jours à Paris. **33** (*Je partais / Je suis partie*) entre deux sessions d'études. **34** (*C'était / Ça a été*) en février. Au départ **35** (*je ne devais / je n'ai dû*) rester qu'une quinzaine de jours. et je suis toujours là! **36** (*Je travaillais beaucoup / J'ai beaucoup travaillé*). Jusqu'au jour où **37** (*j'arrêtais / j'ai arrêté*).

Q: Ne regrettez-vous pas ce métier?

R: **38** (*Je n'avais jamais / Je n'ai jamais eu*) l'ambition de faire une carrière de mannequin. Mon but **39** (*était / a été*) uniquement de voyager et de payer mes études. Si **40** (*je voulais / j'avais voulu*) réussir, je me serais totalement investie dans ce métier. **41** (*Je donnais / J'ai donné*) la priorité aux études.

IX. LITERARY STUDIES

THE CASE OF TRANSLATION: THE SHORT-CUMMINGS OF POLISH

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1. THE SHORT-CUMMINGS OF TRANSLATION. In this paper, I will address the problems of translating the work of an American poet, e.e. cummings, a representative of the 'new poetry'. His poems prove extremely difficult to translate for reasons that I will briefly detail below.

The translator of cummings' poetry will first have to bear in mind *what* the poetry expresses. But he will also have to pay particular attention to, in cummings' idiom, 'its hows'.[1] These are of a double nature: there is, on the one hand, the regularity—strict pattern of correspondences and similarities between the parts of a poem, and, on the other, 'a kind of roughness, coarseness of the poem's texture' (Heydel 1993:71, translation mine). These three elements—the ideas expressed by the author, the correspondences between the parts of the poem, and the roughness, 'ungrammaticality' of the language applied—are as if three points in which the construction of a cummings' poem is made fast. It is set in position by fixing to the three points: Reference, Roughness and Regularity just like masts and similar structures are stabilised by three points of support.

1.1 REFERENCE. cummings' work is optimistic and affirmative in a great part, it is an apologia of the human being. The poet expressed this creed in the Introduction to his *New Poems*:

> (1) We can never be born enough. We are human beings for whom birth is a supremely welcome mystery, the mystery of growing:the mystery which happens only and whenever we are faithful to ourselves... Life,for eternal us,is now;and now is much too busy being a little more than everything to seem anything,catastrophic included. (P:331)

cummings' faith in the human being—'the beautiful answer who asks a more beautiful question' (P:331) is supernatural and miraculous, as it is based on a particular perception of the reality. As the poet himself wrote in the foreword to the volume *IS 5*:

> (2) Whereas nonmakers must content themselves with the merely undeniable fact that two times two is four, [the poet] rejoices in a purely irresistible truth (to be found, in abbreviated costume, upon the title page of the present volume). (P:163)

cummings claims that the subjective means the supreme, the real.

There is, however, a dark side to the poet's affirmation and optimism. cummings cannot fail to observe, and he feels obliged to denounce strongly, all that is, to paraphrase the poet's words, 'unnatural, which is finite, which is no'.[2]

cummings' violations of linguistic convention are not a proof of the poet's attempt to destroy language but rather to recreate its iconic role. His 're-analysis and decomposition' (term from Slobin 1985) of the language is indeed well motivated. The 'coarseness' of cummings' poetry serves in most cases to create in the elements of his poems allusions to other entities, whether physical, mental or linguistic.

One of the aspects of the reality that are reflected in cummings' poetry is the shape of things. Through typographic rearrangement of his poems, cummings creates shapes corresponding to the subject dealt with: a sunset, full moon, etc.:

(3) *...mOOn Over tOwns mOOn...*

(*mOOn Over tOwns mOOn*, P:277). In a manner similar to 'painting' shapes, cummings creates images of motion:

(4) *...brought allof her tremB*
-ling
to a:dead.
stand-
;Still)...

(*she being brand*, SP:15) with the rhythm of the movement and even the shiver of the machine (the stressed 'B') rendered by linguistic means. 'In order to indicate slow tempo, words are spread apart by hyphens or spaces. ...In order to indicate quick tempo, several words are... run together as one word'. (Munson 1962:11).

Also the most prototypical of the instances of iconicity, the onomatopoeia, is present in cummings' poetry, as well as numerous attempts at recording or imitating actual speech, as in:

(5) ...too much o much cheap
me i work i say i have
not any
never
no vacation here...

(*i say no world*, SP:46), where both the ungrammaticality and the clumsiness of everyday speech is recorded. Apart from the allusions to the elements of the outside world, words in cummings' poems often make reference to linguistic entities—other words or texts. Such allusions often are of metaphorical nature, as in the following excerpt from the poem *you no* (150W:313, transl. Barańczak):

(6) *...& i*
ob
serve no
body wants Most...

which presents one of the numerous allusions created by splitting other words, the most important being the ones foregrounding the negation: in the quoted excerpt, the line 'serve no'—the echo of Satan's 'Non Serviam'.

All these allusions in themselves will present great difficulty in translation. The fact that they are frequently expressed in cummings' poetry by means of typography and word destruction will make the translator's task still more difficult, sometimes indeed impossible.

1.2. ROUGHNESS. In colloquial language, the attention of the listener is focused on the whole structure rather than on individual compositional elements. Putting it metaphorically, language is to an average user a smooth fabric, whose structure—the knots, threads and so on—is not very prominent. The literary language, on the other hand, draws much more attention to the way in which it is composed out of individual elements. To elaborate further the textile metaphor, the language of literature, and that of poetry in particular, is a very fine or a very unconventional fabric. Readers of literature expect the composition of a poem to be a 'very fine fabric', worth closer inspection. Thus the language of poetry is perceived as, and usually is, less 'smooth' than the colloquial language. Its structure is more 'rough'—its component elements gain prominence at the cost of the whole.

In cummings' oeuvre, this is even more prominent. The fabric of his poems is extremely rough, the tissue sometimes so loosely woven that there is hardly any overall structure to be perceived, just isolated elements. This specific roughness results from non-canonical approach to the rules of English. The poet consistently uses commas, periods, colons etc. only in these situations in which they serve to express his individual need to separate two entities. Similarly, upper case is applied only to stress salient elements, and not obligatorily in sentence beginning or to mark proper names or other conventionally capitalised elements. Moreover, the poet often ignores the constituency and sentence structure, ordering elements of a predication in an idiosyncratic way, as in:

(7) *...though dull were all we taste as bright*
bitter all utterly things sweet...

my father moved through dooms of love, SP:45), where the adverb utterly is placed in a position where adverbs usually do not appear, i.e. directly before the noun, creating an ambiguity—it may modify (as adverbs usually do) the adjective, or, untypically, the noun that it precedes.

The device that is to a great extent responsible for the effect of roughness in cummings' poetry is *conversion*. By unconventional changes to the grammatical category of entities, the poet frees the words off the syntactic structure, 'parenthesising' them, thus creating new senses:

(8) *...**septembering** arms of year extend*
less humbly wealth to foe and
than he to foolish and to wise
offered immeasurable is...

(*my father moved through dooms of love*, SP:45, emphases mine). In order to create correspondences to other entities, either within the poem itself or in the outside reality, the poet will also intrude into the texture of the linguistic elements—change the spelling, combine different words, etc., as in:

(9) *...neck and senecktie*
are gentlemen ppoyds,
even whose recktie
are covered by lloyd's...

(*flotsam and jetsam*, SP:41). Unexpected senses are also produced by the poet's choice of the foregrounded participant of the situation, by the manipulation of the scale of the described entities, or of the specificity in the description. A particular feature of cummings' poetry is the choice not to specify the exact nature of the described phenomena. The poet uses terms like 'flower' or 'tree' rather than more specific ones: 'tulip' or 'oak'. In this way he produces ambiguous, multifold senses.

1.3 REGULARITY. Apart from the violations of the linguistic convention and the multifold allusions, a cummings' translator will have to render the internal regularity, symmetry present in the poet's work. Most of devices of this sort—rhyme, meter, semantic contrast—will present problems similar to those posed by the work of other poets. In a cummings' poem, however, they will be highly condensed and coexist with other features of the text, discussed above. Moreover, these regularities will sometimes operate on unconventional levels. Apart form regular rhyme ('correspondence in the final sounds of words or lines of verse'—W II), the poet will use *visual rhymes* (cf. Fedorowicz 1968)—the correspondence of pairs of words which have identical endings in spelling, and not necessarily in pronunciation, or *initial rhymes*—phonetic correspondences in the line-initial rather than line-final words. Among numerous other methods of creating correspondences between elements of the text, let us mention only the most radical ones: creating syntactic, semantic or phonetic patterns by repetition of similar constructions, often with violation of conventional rules:

(10) *...love is less always than to win*
less never than alive
less bigger than the least begin
less littler than forgive...
(*love is more thicker than forget*, SP:48).

Let us recapitulate: the translation of a cummings' poem has to render the three foundations of the poet's work: its linguistic roughness, its internal regularity, and the multifold senses it expresses. The difficulties that each of those presents separately will be multiplied by the fact that their condensed presence is to be found even in a shortest poem. The reading, and what follows, the translation of a cummings' poem requires constant interpretation both in the linear and the non-linear sense. Each word, each syllable, even each character may function as a separate unit and, in addition to the regular, linear meaning, provide individual senses. Even the tiniest linguistic element acquires in cummings' work an autonomy from the immediate context and may make an allusion to some other element of the poem, of the language, of literature, of the physical reality. This slackening of links between the elements of the poem and the resulting myriad ambiguity form the very core of cummings' poetics.

2. THE SHORT-CUMMINGS OF POLISH. From the short listing of the features of cummings' poetry, we conclude that many of the aspects of the poet's opus will be hardly translatable into other languages, sometimes because of their amassing, sometimes due to the inherent qualities of the medium that the

poet uses—the English language. In the following remarks, I will discuss the difficulties that arise with an attempt to translate cummings' opus into a specific language, by presenting a few features of Polish which will hinder the translation of certain aspects of cummings' poetry into this particular language. The use of some of the techniques discussed before will be highly limited in Polish due to its grammatical construction.

2.1. THE COMPLEXITY OF WORDS. The words in Polish are in general more complex and, consequently, usually longer than in English. That means, on the one hand, that it should be easier to split them, producing new senses. On the other hand, though, this 'complexity' concerns also these words which should be created by splitting longer entities. Apparently, Polish lacks an appropriate supply of short lexical items that could function as parts of a larger word. Thus the rendering of cummings' allusions between words or parts of words is highly difficult.

2.2. FLEXIBILITY AND ROUGHNESS. Polish is more flexible than English in grammatical organisation. In Polish, the word order is not as strict as it is in English, and more sentence arrangements are deemed 'grammatical'. An average speaker of Polish has almost as much freedom in using diverging word orders to express different senses as cummings does in his poems. Consequently, in Polish, the poetic effect of such 'reordered' expressions will be much less prominent; as they would be not so 'fresh', the 'violation' not so radical.

2.3. LIMITED GENERALITY. The grammatical structure of Polish is more defined than that of English. In Polish the links between elements are quite overtly marked by means of function morphemes (inflexional suffixes etc.). What results from the stronger linking of the elements, is the more uniform texture of the structure of Polish. In opposition to the 'roughness' of English (and still more, cumingsese), Polish is 'smooth'—its texture not so coarse, the component elements not so apparent. The fact that the elements of a Polish predication are more strongly linked to the other elements of the context, makes the 'isolation' of linguistic units—one of cummings' basic devices—extremely difficult.

3. CASE IN POINT. THE PROBLEMS OF DECLENSION. To illustrate the degree of difficulty of the task of translating cummings' work into an exotic language like Polish, let us consider the problems that result from the divergence of the languages—English (or the cumingsese) and Polish in just one respect: the existence of a declension system. The morphological structure of Polish nouns is much more complex (read: archaic) than that of English.

3.1. CASE AND LINKING. Thus, for instance, the grammatical case of a noun—and the resulting linking to some element of the predication—will be clearly manifested by the presence of a suffix. This fact practically disables the rendering in Polish of one of the important features of cummings' poetry—the generality of the reference an entity makes, and the resulting ambiguity. For instance the ambiguity present in the poem [no time ago] (SP:72; 150W:271, transl. Barańczak) seems to be impossible to render in Polish:

(11) *...walking in the dark*
i met christ
jesus)my heart
flopped over
and lay still [...]

...idąc w mroku
spotkałem jezusa
chrystusa) moje serce
zatrzepotalo się ciężko
i znieruchomiało...

The word 'jesus' in the original is ambiguous— it may be interpreted either as the accusative case: 'I met Christ[,]Jesus' or an exclamation: 'Jesus!' (vocative case). In Polish, the presence of inflexional suffixes disables this ambiguous reference, allowing only for one version: 'spotkałem Chrystusa(acc) Jezusa(acc)' or: 'spotkałem Chrystusa(ACC). Jezu!(VOC).

3.2. CASE AND CONVERSION. As it was stated above, the elements of a Polish predication are more strongly linked to the other elements of the context (due to the presence of function morphemes). This renders the 'isolation' of elements—as in the technique of conversion—extremely difficult. In Polish, such a procedure would require using words in their basic forms—nouns in nominative, verbs in infinitive etc.—regardless of the specific form dictated by the context. This, however, produces in a Polish reader an impression of excessive coarseness, creates an 'unpoetic' effect.

Another possibility would be the choice of such structures which require verbs, nouns etc. in the basic form, or of such forms of entities which are identical to the base form. In this way the linguistic shock would cease to dim the reception of the poetry, and the effect of the 'isolation' of the converted words would be achieved, as in the following example (*what if a much of a which of a wind*, SP:58, translation mine):

(12) *...blow hope to terror;blow seeing to blind*
(blow pity to envy and soul to mind)...

...zmieć ufność w strach, zmieć wzrok w oślepły
(zmieć litość w zazdroœæ, a czucie w myśl)...

here the choice of the transitive verb *zmieść* 'sweep', of the structure: V-N(ACC)-N(ACC) and the selection of nouns which have identical forms in Nominative and Accusative practically eliminates the excessive roughness. However, in our zeal to eliminate the 'unpoeticity' of the translation, we have also got rid of an important asset of the original—its characteristic roughness.

3.3. CASE AND AGENTIVITY. Finally, let us discuss the way in which the case form applied co-operates, 'conspires' with other elements of the text in creating a certain image. In order to that, we will analyse an excerpt from a cummings' poem, *when everything happens that can't be done.* The poem is an apologia of individuality, life and love, and simultaneously it denounces all that is not individual, lively and full of love. In the Polish translation (150W:248, transl. Barańczak), among other serious deformations of the poem's meaning, the greatest changes are made in the lines concerning the two heroes of the poem: *we* and *one.*

In the original, *we* is presented as the active force, the central participant of the description, grammatically the subject of the sentences. This depiction is perverted in the translation: we are no longer the agent of the processes, no longer the subject of the sentences. *We* are passive sufferers of some strange phenomena going on **in us**. Sufferers indeed, because:

(13) *...ktoś znaczy nas pięknem jak piętnem...*

('somebody stamps us with beauty as if with a brand'), while in the original:

(14) *...there's somebody calling who's we...*

we are calling, we are active, we are not some supreme being's cows, branded against our will.

Even more severe damage is done to the other hero of the poem: *one.* The apparent simplicity of cummings' constatations lulls the translator into complete ignorance of its nature. Let us sum up its characteristics in the original. The individual (human being) is the greatest:

(15) a. *...there's nothing as something as one...* (line 9)
b. *...one hasn't a why or because or although...* (line 10)

c. ...*one's anything old being everything new*... (line 14)
d. ...*one's everyanything so*... (line 18)

One is everything (d), more than anything else (a), *one* is both any old thing and all the new ones (c), *one* has no raison d'etre and no need for it ('one hasn't a why or because'), (b), *one* has no alternative (one hasn't [...] although.

When we consider the corresponding section of the translation, we notice that the hero of the poem, one, disappears from the translated version. It becomes *jedność* 'unity', whose existence is not altogether certain. After a somewhat banal constatation:

(16) a. ...*że można z niczego coś stworzyć* ...

('that something can be created out of nothing', line 9), we learn more about the nature of this something:

b. ...*to coś jest jednością bez celów i przyczyn*...
c. ...*jednością tak dawną że nową już*...,
d. ...*jest wszystkim czymkolwiek i niczym*...

('this something is a unity without aims or reasons; a unity so old that [it is] already new; [it] is everything, anything and **nothing**(!)', lines 10, 14 and 18).

The message that the translation conveys is the following : 'It is possible to create, out of nothing, a unity without goals or origins, so old that it becomes new, a unity which is everything, anything and nothing', or, in short: 'It is possible to create nothing out of nothing'.

This effect of trivialisation of the poem's content is brought about by a number of elements contained in the translated version. The most obvious is the choice, in the place of the English one, of the Polish word *jedność*, equivalent to the English notion of *unity*, i.e. rather an (abstract?) whole composed of many elements than a (concrete?) individual, a tangible entity. Another notable change is the addition of the word *niczym* ('nothing'-INSTR), which completely reverses the message of the original.

On closer inspection, however, we discover that the shift in meaning is brought about by far more than lexical substitution, that it results from changes in the structure of the utterances describing *one*/*jedność*. Let us note that in the original, *one* is the subject of the utterances (even in (16)a *one* could be treated as the subject, *there* being the expletive), and certainly the focus of attention.

In the Polish translation, *one* disappears from a, substituted by the vague *coś* 'something', to appear in the subordinated clauses b and c—in the form of the abstract *jedność* 'unity'— not as the subject of the clause, but the attribute of *coś* 'something'. This change in the structure of the sentence leads to passivisation of *one*, which parallels the lexical shift brought about by the substitution of *one* with *unity*. *One*—a tangible individual, an active participant of the scene—is replaced by *jedność/unity*—an abstract entity being merely an attribute of an even more abstract *coś/something*.

Let us consider the role of case-marking in this semantic shift. The English *one* is an unmarked pronoun, which would be rendered in a declension system of Polish by a pronoun (or noun) in the Nominative case. In the Polish translation, on the other hand, the corresponding *jedność* 'unity' is Instrumental-marked. In the Polish declension system, the Instrumental is applied to mark the instrument of the action and the extensions of the category—the manner, the role, etc. The Instrumental-marked entity is thus labelled as secondary, auxiliary, non-active. The Instrumental-marked entity is not normally the active participant of the situation described. Therefore, the Instrumental marking of the two instances of the word *jedność* in the text contributes to the overall shift in the organisation of the conceptual content of the poem by portraying the entity as passive.

A similar effect of passivisation is produced by the use of the Locative case in the translation of the following clause:

(17) *...silence through twilight's mystery made flesh...*
...ciszo,/ co w zmierzchu niepojętym stajesz się nam ciałem...

which reads in the Polish translation: 'silence, which in inconceivable twilight becomes to us flesh'. Here the original's construction interpreted normally as Accusative is replaced by Locative. Although the Accusative-marking does not code activity, it certainly characterises the entity thus marked as a participant of the event. The locative, on the other hand, is attributed to those entities which do not play an active role in the described event. 'Locative cases... usually pertain to the scenery in which the profiled process develops' (Langacker 1991:236).

CONCLUSION. By the above remarks, I hope to have shown that the grammatical structure of the utterances in a cummings' poem is in itself a vehicle of multifold meanings and thus has to be carefully considered when an interpretation of the poem (e.g. a translation) is attempted. In a well-organised text, such as a cummings' poem is, all elements of the context co-operate in creating the effect desired by the author. This concerns even the tiniest element, often denied any semantic value whatsoever. I hope to have demonstrated that in the analysis of the poem [when everything happens that can't be done], where the case-marking applied in the translation clearly demonstrates the interpretation made and contributes to the overall sense conveyed by the poem.

Now, admittedly, case-marking is neither syntactically nor semantically autonomous. As we have seen in the analysis of the discussed poem, the Instrumental marking results from the choices concerning sentence structure—the subordination of the clauses containing the word *jedność* 'unity' to the main clause with *coś* 'something' as the subject. In a broader perspective, the rationale for the choice of such a case-marker can be traced back to the general semantic interpretation made by the translator, the failure to appreciate the role of the described entity (*one*) in the original.

However, this lack of autonomy of the case-marker is not a proof that the case conveys no semantic meaning whatsoever. Truly, the meaning conveyed by the cases has to contribute to a more general vision. Still, the same could be argued for virtually all elements of a text.

As I hope to have demonstrated, the choice of case-marking is one more element of the careful decision-making necessary for successful translation.

APPENDIX. Here is the excerpt of the poem *when everything happens that can't be done* that was dealt with in the paper:

...there's nothing as something as one
one hasn't a why or because or although
(and buds know better
than books
don't grow,
one's anything old being everything new
with a what
which
around we come who)
one's everyanything so...

...że można z niczego coś stworzyć
to coś jest jednością bez celów i przyczyn
(kwiat powie to lepiej
niż książka przemilczy)
jednością tak dawną, że nowąjuż,
(a my wszerz
w dal
wokoło i wzdłuż)
jest wszystkim czymkolwiek i niczym...

Abbreviations:
150 W— e.e.cummings, *150 wierszy/poems*
P—e.e.cummings, *Poems 1923-1954*
SP—e.e.cummings, *Selected Poems 1923-1958*
W II—Webster's II New Riverside Dictionary

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[1] The poet uses this expression in the poem *i like my body when its is with your* (150W:60):

> *...i like your body. i like what it does,*
> *i like its hows...*

[2] This is an allusion to a line from *i thank you god for most this amazing* (SP:76) in which the poet thanks God for everything 'which is natural, which is infinite, which is yes'.

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X. GENERAL LINGUISTICS

TAGMEMIC PRINCIPLES AND MUSIC ANALYSIS

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1. ETHNOMUSICOLOGICAL BORROWING FROM LINGUISTICS.

1.1. SEARCH FOR A UNIVERSAL ANALYTICAL PARADIGM. Ethnomusicologists have made numerous attempts to devise analytical systems which would have at least wide if not universal applicability to music systems around the world. Many ethnomusicologists have despaired of finding an all-encompassing framework for the understanding of music styles (e.g. Blum in Myers 1992:165).

1.2. TWO ESSENTIAL CHARACTERISTICS OF A UNIVERSAL PARADIGM. Such a paradigm, first, should enable us to understand a previously unanalyzed alien music system (as opposed to one that can only help us understand our own music system—i.e. that presupposes insider knowledge of the system). It must provide a framework for effective discovery procedures, a paradigm that is heuristically useful. Second, it should allow us to understand a music system in its own terms, and not impose an external order which skews or obfuscates inherent patterns. It must not be rigid, but flexible so that systemic structures can emerge.

1.3. LINGUISTICS AS A PARADIGMATIC SOURCE. Some ethnomusicologists have looked to linguistics as a potential source for an adequate framework for the analysis of musical sound. Steven Feld (1974) correctly points out the dangers of thoughtlessly borrowing concepts and terminology from linguistics for use in musical description and analysis. Some of these problems, however, are not so much due to the differences between music and human speech, but result from a borrowing of linguistic terms without a thorough understanding of the concepts behind them. Mantle Hood's misapplication of the linguistic concepts of phonemic and phonetic in his otherwise excellent book, *The Ethnomusicologist,* is a troubling example of Feld's concern (Hood 1971:54–61).

1.4. TAGMEMICS AS AN ANALYTICAL PARADIGM. Despite legitimate objections to borrowing from linguistics there are two reasons why I believe tagmemics to be useful. First, tagmemics is not only a theory for the study of language but one which is based on general principles of human behavior and therefore should be useful for studying many types of behavior, including music. Second, tagmemics has been shown to be a powerful heuristic tool. This latter quality bodes well for the frequent ethnomusicological task of analyzing music systems which are foreign to the researcher.

It is important to note that I am not a linguist and therefore am not conversant in competing linguistic theories. I seek here to illustrate the usefulness of tagmemics for music but do not address the question of whether or not tagmemics is the best linguistic paradigm from which to borrow for musical studies.

1.5. PARALLELS OF LANGUAGE AND MUSIC. While it is possible to overemphasize the similarities of speech and music, significant parallels do exist. Foremost of these is the fact that both language and music are semiotic systems which depend upon the auditory channel for transmission. Tagmemics' success in the description of human languages gives hope for similar felicitous results in the description of human musics. By placing both music and language in the same theoretical framework, essential differences between the two systems may be clarified.

1.6. APPLICATIONS OF TAGMEMICS TO MUSIC. The most important and extensive application of tagmemic theory to musical analysis is the work of Vida Chenoweth in numerous publications, but particularly in *The Usarufas and their Music* (1979). My first training in ethnomusicology was under Dr. Chenoweth in a course on music analysis using a tagmemic approach. Second only to Chenoweth in the application of tagmemic principles to music is the work of Simha Arom as exemplified in his *African Polyphony and Polyrhythm* (1991).

The emic-etic distinction is the element of tagmemics which has received the most attention. The International Institute for Traditional Music published an issue of *The World of Music* with the theme 'Emics and Etics in Ethnomusicology' (Baumann 1983).

The purpose of this paper is to reaffirm the use of tagmemic principles by these scholars and to illustrate how tagmemics deals with issues of concern to ethnomusicologists in general. Tagmemics organizes and validates existing fruitful lines of ethnomusicological analysis; it challenges biased or otherwise flawed approaches; and it suggests techniques for dealing with phenomena which up until now have been troublesome to analyze. I would like to suggest the utilization of tagmemics as an over-arching theoretical framework for all aspects of musical analysis at all hierarchical levels, from the largest imaginable scale (whole repertories and even the totality of human musical activity) to the smallest unsegmentable sub-note structures. Amazingly enough, (to me, at least) tagmemics can handle all this quite well.

2. MUSICAL TAGMEMICS

2.1. RESTATEMENT OF TAGMEMIC PRINCIPLES IN MUSICAL TERMS. There will be no attempt here to outline tagmemics as either a general or a linguistic theory before applying it to music. Rather, I will simply attempt to illustrate the basic principles of the theory in terms of music.

The presentation of tagmemics as a general theory is found in Dr. Ken Pike's *Language in Relation to a Unified Theory of the Structure of Human Behavior* (1960) and those desiring a full exposition should refer to that work. For convenience, this presentation references tagmemic principles as outlined in the introduction to Ken and Evelyn Pike's textbook, *Grammatical Analysis*, entitled 'Universals in the Structure of Human Behavior' (Pike & Pike 1982:1–6).

2.2. FOUR CONCEPTS OF TAGMEMICS. Pike and Pike's explanation of the underlying principles of tagmemic theory is organized under four general concepts: Unit, Hierarchy, Context, and Perspective.

2.2.1. UNIT. 'Purposive behavior… comes in "chunks" or constituents' (ibid: 2). Units of music have long been recognized by theorists. Notes, phrases, and movements are all examples of units of the musical stream. Tagmemics challenges us to make explicit the means by which musical units are determined. Chenoweth, for example, suggests five principle criteria for the determination of phrases in melody: recognition of terminal points, recognition of structural pattern, recognition by song text, recognition by textural contrast, and recognition by accent (1972:65ff).

Under the concept of unit there are four points: Contrastive-Identificational Features, Variation, and Distribution.

2.2.1.1. CONTRASTIVE-IDENTIFICATIONAL FEATURES. 'In order to find and identify any… unit, one must find in it *features* (or elements, characteristics, components) which differentiate it from all others. Once this has been done, the same features can be used to recognize that unit when it occurs in other contexts' (Pike and Pike 1982:2). For example, the contrastive-identificational features of the two themes in the classical sonata form are the melodic, harmonic, and rhythmic characteristics of each. These two themes are presented in the first section, called the Exposition. The characteristics distinguish the two themes from each other, and also from other material (bridges, codas and so forth) in the piece. One of the primary interests of the second section of the sonata, called the Development, is precisely the manipulation and modification of these distinctive features, and the tension that is produced by the resulting ambiguities.

Non-musical features may be definitive and must be explored in conjunction with elements of music sound. For example, Merriam cites a case from the Solomon Islands and another from Mangareva in which 'new' songs are created by putting new texts to previously existing tunes (1964:181–184). Features function as contrastive within the musical system in which they are found; different features are contrastive in different systems.

2.2.1.2. VARIATION. It is impossible for a human being to repeat any performance exactly. If two musical performances (or parts thereof) are structurally the same within the system, they are emically the same. Differences between two musical performances which are emically equivalent are said to be etic differences.

The degree of pitch variability tolerated (i.e., perceived as structurally equivalent) varies in different musical traditions. George Herzog recognized this problem in his comparison of Pima and Pueblo musical styles:

> The tone itself, as a concept abstracted from experience and in turn as an object of experience, does not exist for the 'primitive', whose analytical and technical interest in music, in our sense, is as a rule very slight. The tones themselves are subject to more variation than ours, depending upon the musical, textual and emotional context; especially since instruments with fixed pitches, which would standardize musical pitch and intonation, do not play an important role. Consequently, in musical transcription of such melodies a 'note' does not stand for an objective unit, an ideally constant tone, but for a functional unit, a mere average value around which the variations cluster. (Herzog 1936:286, 287)

Unfortunately, Herzog does not give the exact procedures he used to determine the 'functional units' of tone other than the hint that averaging was somehow involved. Most transcriptions are published without even any mention of the kind or range of variation which they represent.

Bruno Nettl is one of the first ethnomusicologists to suggest the use of linguistic theory in musical analysis and in as early as 1958 discussed the possibility of phonemic transcription. He continued this discussion later but felt that little progress had been made toward developing a phonemic transcription of music (1964:104, 105).

In 1967, John Blacking seemed to be striving toward some kind of an emic representation in his transcriptions of Venda children's songs. Unfortunately, he does not state precisely the process involved in arriving at the 'generalized norm'.

> The musical transcriptions represent the generalized norm of the children's songs, and are derived from detailed transcriptions which included the characteristics of every performance, which varied greatly according to different performers. No excuse need be made for the omission of these details, as this is a study of the children's songs and not of the numerous ways in which Venda children sing the same songs. All common rhythmic and melodic variations are noted in the transcriptions, but it must be appreciated that no two performers are likely to sing exactly the same intervals on every occasion: even the same singer may produce in one performance intervals of a major second that differ by a number of cents. (Blacking 1967:35)

Among tagmemicists, Chenoweth has tackled the problem of emic transcription in the most systematic and detailed way to date (1972).

Unlike Mantle Hood, who, as mentioned above, mistakenly equated phonemic with 'less detailed' and phonetic with 'more detailed,' Bruno Nettl understood properly these linguistic concepts. He noted the similarity of phonemic and less-detailed transcriptions, but he always kept the distinction clear (1964:105).

The difficulties involved in applying the emic-etic distinction to music highlight an important essential difference between music and speech.

> It should be possible to move from transcription of all musical phenomena perceived by the transcriber to another transcription which gives only the essentials. But one element of language which is a great aid to the linguist is absent here: meaning, in the lexical sense. For in transcribing music, one can usually do little to persuade an informant to distinguish between (to him) correct and incorrect renditions of songs, phrases or intervals. Nevertheless linguists can sometimes deduce the phonemic system without recourse to meaning; they can identify particles of speech from their structure and distinction alone. Similar procedures ought to work for music, at least to a degree (Nettl 1964:104, 105).

Vida Chenoweth's approach establishes emic contrast in melody without resort to referential meaning. Her work is a significant step toward making emic determinations about the smaller musical units. She examines all similar etic melodic intervals to determine whether or not they contrast (in which case they are considered emically different). If they never contrast but do fluctuate they are considered etic variants of one emic unit (Chenoweth 1972:53–57). I have used a similar method to try to determine emic units in the scales (tonal inventories) of Mamaindé vocal music (Avery 1977).

We must comment that Nettl is not accurate in his claim that music has no referential meaning. There are many examples of music which do refer to specific extra-musical items or concepts. In my opinion, the real difference between music and speech in this respect is that speech is usually more concise than music. For more on this see the section below on the referential hierarchy.

2.2.1.3. Distribution. 'No unit of purposive behavior can be identified or recognized in complete abstraction from other units; it exists only in reference to them' (Pike and Pike 1982:2).

2.2.1.3.1. Distribution in class. 'A unit is a member of a *filler class* (a set) of items which may appropriately occur (be *distributed*) in the same *slot* in a particular structure; each member of the class has the same *function*. Two units substituting for one another in such a slot are *analogous* or may be said to be in the same *proportion* in their relation to the containing structure' (ibid:2). The relationship between members of a filler class is usually described as paradigmatic. This can be illustrated by an example from common practice harmony. The filler class of 'subdominant harmony' includes the members of the 'chord built on the fourth degree in root position' (IV) and the 'chord built on the second degree in second inversion' (ii6). One slot which either of these members might occupy is that immediately preceding the 'dominant harmony' at a cadence.

2.2.1.3.2. Distribution in sequence. 'Within any one extensive behavioral event, some items occur before others. The units, therefore, occur in a *sequence*. Certain characteristic sequences are essential to rational behavior and enter the description of every unit' (ibid:3). This aspect has been emphasized to such a degree in music study that it does not need to be illustrated. It includes such concepts as melodic and harmonic progression, the ordering of movements or large sections of a composition, and even the appropriate order of pieces to be performed at a recital or concert

2.2.1.3.3. Distribution in system. 'Behavior is not merely a set of units ordered one after another; always, in the background, lies some kind of general system within which the unit operates' (ibid:3). For example, the significance of the construction of any particular sonata can only be properly understood in light of the ideal system of sonata form which is the conceptual background of those who compose, perform and hear it.

2.2.2. Hierarchy. The second major underlying principle of tagmemic theory is that of the Part-Whole Hierarchy. 'Hierarchy is seen when small units are found within larger ones, and these in turn in still larger units... Note that part-whole relations are an essential characteristic of each of the three major tagmemic hierarchies. These part-whole relations are not to be confused with the *specific-generic* relations which may be called *taxonomic hierarchies*, of which there are many' (ibid.:3). Three simultaneous but not structurally equivalent hierarchies are recognized in tagmemics: Phonological, Referential and Grammatical.

2.2.2.1. PHONOLOGICAL HIERARCHY. The relation of musical sounds to their containing (including) units such as intervals, motifs, phrases, periods, and sections comprises the phonological hierarchy.

Phonological rules operate on all levels of the hierarchy from, for example, in Western European music of the Common Practice Period, the lower-level rule governing the proper resolution of the leading-tone to high-level rules concerning proper key relationships between symphony movements. Researchers which concentrate on the structure of music sound are primarily engaged in the formulation of phonological rules.

The value of the concept of hierarchy is that it clarifies how large a chunk of the sound stream you are dealing with at any point in the analysis, and how that chunk relates to larger and smaller chunks. This is vital to keep in mind since meaningful variation is significant on a specific hierarchical level. Figure 1, a phonological hierarchy of an Azorean *cantoria* (evening of singing), illustrates an analysis of a musical event which lasts several hours. A *cantoria* involves a series of *desafios* (song duels) between two singers. (Four singers typically participate, pairing off in different combinations for the four desafios presented during the course of the evening.) The duelists argue back and forth in sung rhymed quatrains. Each song duel may last 20 minutes or more. (For more on the *desafio* see Avery 1984.) Due to space limitations, only selected nuclear elements are shown.

2.2.2.2. REFERENTIAL HIERARCHY. Units of meaning combine to form larger units which in turn combine to form still larger units. The referential hierarchy is composed of larger and smaller chunks of referential meaning. By musical meaning I am referring to the ability of music to bring to mind extra-musical ideas, emotions or associations. The size of minimum segments with referential meaning varies from culture to culture. Programmatic music, of course, has extra-musical referents. The doctrine of affections of the late baroque, employed specific musical structures to refer to specific emotional states. Film music also communicates emotions and is so powerful that the same footage with different music can have a totally different emotional impact on the audience. The Hindu ragas are well-known for their extra-musical referents.

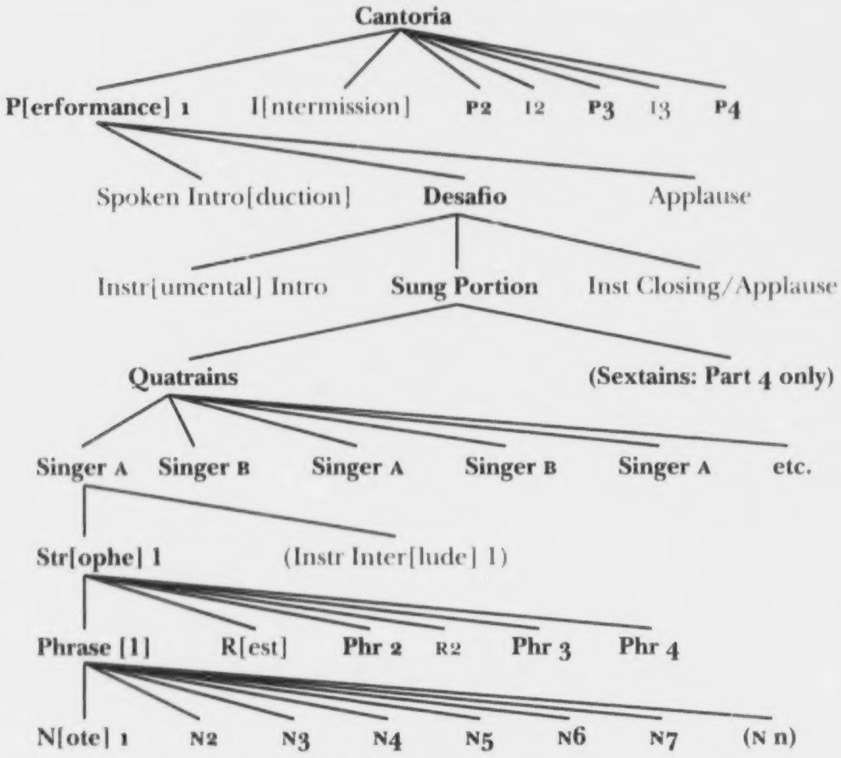

Cantoria
P[erformance] 1
I[ntermission]
P2
I2
P3
I3
P4
Spoken Intro[duction]
Desafio
Applause
Instr[umental] Intro
Sung Portion
Inst Closing/Applause
Quatrains
(Sextains: Part 4 only)
Singer A
Singer B
Singer A
Singer B
Singer A
etc.
Str[ophe] 1
(Instr Inter[lude] 1)
Phrase [1]
R[est]
Phr 2
R2
Phr 3
Phr 4
N[ote] 1
N2
N3
N4
N5
N6
N7
(N n)

Figure 1: Part-Whole Phonological Hierarchy of an Azorean Cantoria (simplified). Bold items are nuclear, others are marginal. Items in parenthesis are optional. Bracketed elements are full spellings of abreviations. Items numbered 'n' indicate an indeterminate number occuring.

Note that I do not use the term musical meaning in the same sense as Meyer (1956), who employs it to refer to structural expectations in music. The important role of structural expectations is more analogous to poetics than semantics in linguistics. Vital differences between music and language can only be understood if by 'meaning' we mean the same thing for music and language.

For example, musical meaning is much less concise than meaning in speech. It is not uncommon for a whole piece (or even a whole stylistic category) to convey only a single meaning, frequently the social context in which that piece (or style) is usually heard. In other words, the minimum musical unit which can be identified to have an extra-musical referent usually occupies a larger space in real time than most words in human speech. I suspect that even an apparent exception to this rule, the Tepehua Thought Songs as described by Boilès (1967) may not, in fact, be so exceptional in their conciseness. Though Tepehua is not a tonal language, the Tepehua do use a type of whistle speech the pitches of which reproduce sentence intonation (Cowan 1972:695). One wonders if the presence of whistle speech among the Tepehua is a factor which makes it possible for Tepehua thought song to display such unusual conciseness and such speech-like structures.

There are at least three factors which make music less concise than speech in the transmission of meaning: greater redundancy, more time needed to realize distinctive features, and, possibly, greater syntagmatic length.

Most music systems require considerable redundancy in order to conform to norms of style. This may be in the form of the exact repetition of a melody, motif, or phrase. Alternatively, it may be some type of variation on the original musical material. There are many methods of variation including, to name a few, augmentation, diminution, fragmentation, elaboration, ornamentation, modulation, inversion, and reharmonization. Of course not all music systems use all of these resources, but the fact remains that both exact and varied repetition are a part of every music system that I have analyzed.

Unlike every-day utilitarian speech, music is valued for its form per se as much or more than the information that it transmits. In this way, music is much more like poetic speech which also is frequently more redundant than every-day verbal communication.

Music makes up for its low information load by transmitting its limited message with great power and richness, often by evoking vivid memories of the social occasion in which it usually occurs.

A second reason why speech is more concise than music is the difference in the amount of time taken for the realization of the features of each. In speech we find that consonants are pronounced in a very short amount of time, especially the stops. Consonants like fricatives, and vowels, take slightly longer to realize. Distinct pitch in music takes relatively longer to establish, as does rhythm which is dependent upon relative lengths of time. Song is a good illustration of the relative speed at which verbal and musical utterances can be made. Only rarely does vocal music proceed at anywhere near the speed of the song text if spoken. Recitativo secco approaches this.

I suspect that the principle of syntagmatic length also has a direct relation to this issue. It seems that speech has a relatively larger number of elements in paradigmatic contrast available for each of the positions than music, and therefore can produce a greater number of contrasting higher level units while still using fewer positions.

The fact that we can sometimes recognize a whole melody (and therefore the meaning associated with it) from a very brief musical portion would perhaps argue against syntagmatic length as a necessary factor in the 'long-windedness' of musical communication. If I hum the first six notes of the birthday song most people will recognize it as belonging to this important rite of passage and may even think of party hats and cakes with candles. In the actual occasion of a birthday party, however, the whole song, with all its redundancies, must be sung or something will be 'wrong.' Also, if I changed one of those first six notes, (e.g., by lowering the final note a half step), it would not change the meaning from 'birthday' to 'christening' or anything else. My performance would either be taken a flawed attempt to sing the birthday song, or carry no meaning at all since the new phrase would not be recognizable.

The bottom line is that, for many if not most music systems, the phonological hierarchy extends to a much lower level than the referential hierarchy. This makes it much more difficult to determine small phonological emic units and it has implications for the nature of the grammatical hierarchy.

2.2.2.3. GRAMMATICAL HIERARCHY. 'When types of *specific, dictionary* (*lexical*) items or sequences of items serve in parts of larger units made up of such items, the relation of the *included* parts to types of including patterns (and, through the including whole, to each other) makes up a *grammatical hierarchy*' (Pike and Pike 1982:4). Note the reference to lexical items in the definition of the grammatical hierarchy. This use of the term 'grammar' is different from many writers who have referred to the 'grammar of music' when dealing with what I would call the phonological structure of music. This is the most important divergence of the approach suggested here with Chenoweth's work. She defines the grammar of music in terms of sound structure: 'the serial arrangement of intervals and their functional relationships to each other and to the tonal center' (1972:83). No extra-musical referent is involved. In the system presented here, these relations would be considered phonological.

Grammatical function can be more easily illustrated than explained. This is probably because it has not often been considered and no standard grammatical terminology (such as noun, verb, preposition) has been established for music. The solo organ music in a church service may illustrate grammatical function. Frequently there is a prelude at the beginning, an offertory somewhere in the middle, and a postlude at the end of a service. Each of these serves a particular grammatical function in this social event. The precise phonological characteristics do not determine the grammatical function of these units. (It is true that the postlude is frequently louder than a prelude or offertory. But a too-loud offertory, though perhaps not appreciated by members of the congregation, will not cause them to think that the service is over.) Neither does the precise referential meaning of the music played determine its grammatical function. The very same piece may conceivably be played for prelude, offertory, or postlude. Nor is it necessary that an offertory piece be based upon a hymn which exhorts people to give money to God. Thus, the grammatical function can be viewed separately from its phonological or referential characteristics.

A level on one of the three hierarchies may or may not have a corresponding level on one of the others, but because of the close relationship of the grammatical hierarchy to the referential hierarchy, the 'chunks' in the grammatical can be no smaller that the 'chunks' in referential. Thus we may note that, in general, grammatical units of music are likely to occupy more real-time than grammatical units in speech (in the same way that referential units occupy more real-time as previously discussed).

2.2.3. CONTEXT. 'The analyst must, for some purposes, turn his focus away from specific units-as-if-they-were-isolatable (or almost isolatable) and focus instead upon the units-as-necessarily-in-context, since no unit is findable or definable except as in relation to context' (Pike and Pike 1982:4). The context is not limited by size. It may be as large as the culture as a whole or as small as the interval which precedes and the interval which follows a particular interval. There are three concepts which fall under the category of context: form-meaning composite, change via a shared element, and universe of discourse.

Space does not allow me to develop here this important concept in musical terms. It is an issue that has been of increasing interest to ethnomusicologists over the last twenty years (see Stone 1982). I know of no one, however, who has dealt with it from an overtly tagmemic perspective. Perhaps the felicitous shift in ethnomusicology away from the view of music as artifact to music as meaningful only in context would have taken place sooner had more ethnomusicologists read all of Ken Pike (1960) and not fixated on the emic/etic distinction!

2.2.4. PERSPECTIVE. Tagmemic theory offers complementary approaches which allow the researcher to analyze a phenomenon from different viewpoints thus increasing the chances of observing patterns inherent in the data. The three perspectives are the static, the dynamic and the relational.

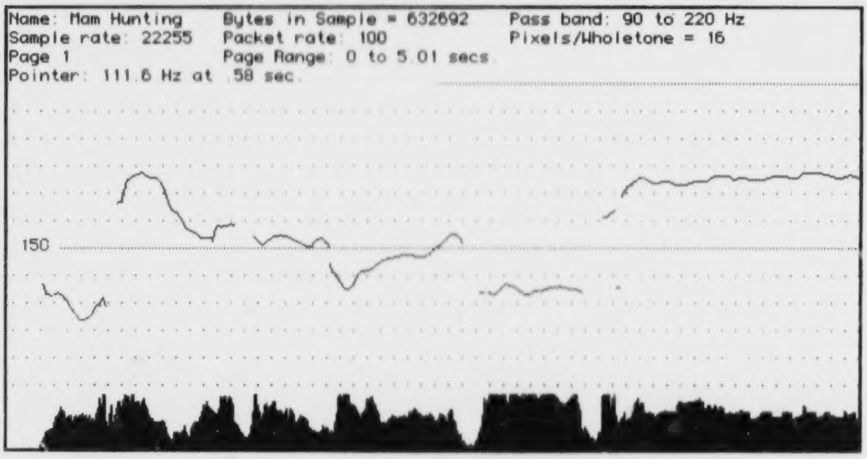
2.2.4.1. STATIC (PARTICLE) PERSPECTIVE. 'The observer can look at the world as made up of "things" (particles, elements, items). In some sense this is treated as the basic, or *normal* perspective' (Pike & Pike 1982:5). This perspective has been adequately illustrated in the above discussion concerning the three tagmemic hierarchies. It is important and basic to the theory. However, 'the precise point in a structure where one unit stops and another begins is not always possible to determine. We refer to this characteristic as the *indeterminacy of segmentation.* Nevertheless, for many purposes, segmentation is necessary and in those instances may have to be made arbitrarily' (ibid:26). To avoid serious distortions in cases of segmentation indeterminacy, an alternative perspective by be employed, the dynamic.

2.2.4.2. DYNAMIC (WAVE) PERSPECTIVE. 'The observer can look at a series of 'discrete' events and treat the whole as a single dynamic moving entity and any single unit can be viewed dynamically, as having beginning (initial margin), middle (nucleus), and end (final margin). In such an instance the unit is viewed as a *wave*... two adjacent units may *merge* or *overlap*, leaving *indeterminate borders*, such that the two units cannot be segmented without doing violence to the data' (ibid:5).

Although the particle perspective in ethnomusicological analysis has been very productive, one of the reasons for its prevalence may be not only its usefulness but also the widespread use of Western music notation. As Seeger has pointed out, Western notation involves a mixture of symbolic and graphic features (Seeger 1958). One of the symbolic features is the 'note head', which primarily functions to indicate proportional time but also, because of its form, tends to 'fix' the note onto one pitch during the course of its duration. Graphic notations (often produced by machines such as the melograph) are brutally frank in their reminder to those of us who use modified Western notation for music transcription, that successive pitches are not as distinct as they might seem to be, that they often merge in 'dips' and glides. Of course, there are a number of ways such 'slides' can be approximated using Western notation by the use of special symbols. But when one is actually transcribing music, especially that which contains a great deal of sliding, one is forced to make a decision as to where on the glide to put the note head. After this decision is made, then (in most cases) the pitch on which the note head is written is considered part of the 'tonal stuff' of the music while the glide is usually considered as some kind of 'ornamental' feature or musical articulation. Ignoring, for the sake of brevity, the implication of the term 'ornamental,' one must question the propriety of making a distinction that might not be justified by the data just because our notation forces us to. On the other hand, most of us do not know what to do with all those slipping and sliding curves on the melogram (Merriam 1964:59). Because the most common traditional analytical techniques are based totally on a particle perspective, it is much easier to force every melodic manifestation into a real or imagined note for expediency. Unfortunately, the notes are rarely as 'concrete' in reality as they seem to be on paper.

The melogram in figure 2 traces the gliding fundamental pitch of the beginning of a Mamaindé (Mato Grosso, Brazil) hunting song. Using traditional Western notation to transcribe this would seriously distort the wave-like internal structure of many of the notes.

It is in dealing with machine-produced music graphs that the wave perspective can be especially useful. Boundary indeterminacies need not be glossed over. They can be recognized for what they are and dealt with.



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Name: Mam Hunting      Bytes in Sample = 632692      Pass band: 90 to 220 Hz
Sample rate: 22255     Packet rate: 100              Pixels/Wholetone = 16
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Figure 2. First part of a Mamaindé Hunting Song. Wavy line is the changing fundamental pitch. Center line indicates 150 Hz. Bar graph at bottom indicates loudness (amplitude).

2.2.4.3. RELATIONAL (FIELD) PERSPECTIVE. 'The observer can eliminate from the center of his attention the form or content or extension of the units as such, and focus instead on the *relationships* between them. The unit, in this case, contracts to a point in a *network* (or *field*) of relationships' (Pike & Pike 1982:5). To my knowledge this aspect of tagmemics has not been applied to music, but I believe there is significant potential.

One such application of the field perspective would be for analyzing the social and musical interactions between members of an instrumental ensemble. In the Azorean *desafio*, briefly mentioned above, a complex communication network is established. There are the two dueling singers, usually two accompanists, and the audience members. The singers communicate with each other, each responding to the other's comments, but always for the benefit of the audience. The accompanists must attend carefully to the singers in order to follow the rubato tempo and listen for melodic clues by which a singer may signal the use of an alternative chord progression which is occasionally used. The singers may also directly address the audience. The audience, for its part, communicates its admiration (or disappointment) for the performance by applause or laughter. The structure of these relationships can best be understood from a field perspective.

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COMPLEX OBJECT–PARTICIPLE AGREEMENT IN OLD CATALAN AND OLD SPANISH

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THIS PAPER DESCRIBES object-participle agreement with complex agreement controllers in Old Catalan, Old Spanish, and Old Aragonese, accounting for attested patterns of agreement. The textual record in Eastern Ibero-Romance shows that even if there is more than one argument which may potentially control object–participle agreement, only one of the conjuncts usually determines agreement. Alcover 1908, in a rare reference directly on point, asserts that if conjuncts are of mixed gender, the shape of the past participle is due to only the closest one. As shown below, this observation overlooks evidence that the first conjunct—as a potentially more distinct conjunct—may control agreement, and also that resolution rules may determine the gender and number of the past participle (see Corbett 1991).

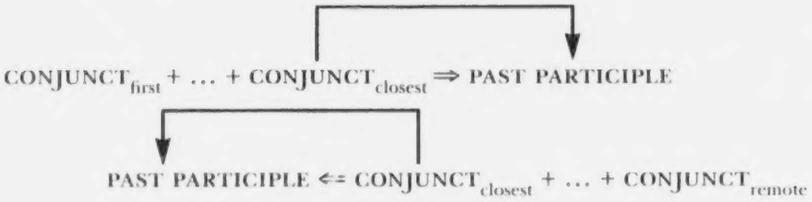
In the context of this study, agreement controllers are either the direct objects of a past participle or the antecedents of a direct object relative pronoun. Complex controllers of object–participle agreement usually consist of two conjuncts. Closest conjuncts (after Morgan 1984) are the nearest NPs to the past participle. On the other hand, first conjuncts are NPs that precede the past participle and are first in a series of agreement controllers. If there are more than two pretarget conjuncts, those that intervene between the first conjunct and the closest conjunct are called middle conjuncts. Posttarget conjuncts that follow the closest conjunct are called remote conjuncts.

(1) a. [FIRST CONJUNCT + MIDDLE CONJUNCT(S)) + CLOSEST CONJUNCT] ⇒ TARGET PAST PARTICIPLE
b. TARGET PAST PARTICIPLE ⇐ [CLOSEST CONJUNCT + REMOTE CONJUCT(S)]

Closest conjunct control is when the conjunct closest to the target past participle, whether preceding or following it, controls agreement (see example 2, next page).

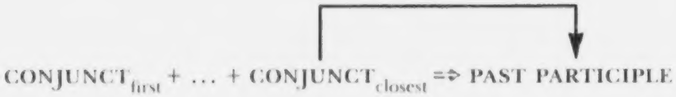
First conjunct control occurs when the leftmost conjunct preceding the target past participle controls agreement.

(2)



CONJUNCT$_{first}$ + … + CONJUNCT$_{closest}$ ⇒ PAST PARTICIPLE
PAST PARTICIPLE ⇐ CONJUNCT$_{closest}$ + … + CONJUNCT$_{remote}$

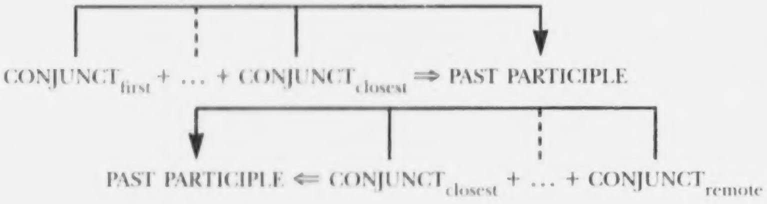
(3)



CONJUNCT$_{first}$ + … + CONJUNCT$_{closest}$ ⇒ PAST PARTICIPLE

Resolution is the result of every conjunct specifying the shape of an agreeing element.

(4)



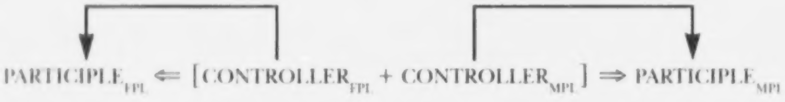
CONJUNCT$_{first}$ + … + CONJUNCT$_{closest}$ ⇒ PAST PARTICIPLE
PAST PARTICIPLE ⇐ CONJUNCT$_{closest}$ + … + CONJUNCT$_{remote}$

Textual evidence suggests that the closest conjunct is the default controller of agreement. For instance, (5) involves a single complex NP of mixed gender controlling the shape of two past participles resting in separate clauses.

(5) havem **venjades**$_{FPL}$ [$_{NP}$ les nefandíssimes [INJÚRIES$_{FPL}$ **e** DANS$_{MPL}$]
[que·ns havien **fets**$_{MPL}$]][1]
'we have avenged the atrocious injuries and harms that they had done us'
(*Tirant lo Blanch*, 1490, València, fol. c4^{v}*b*; §27: ¶1/23—OCat)

The differing inflection on the two past participles in (5) illustrates how object–participle agreement depends on the closest conjunct. While the complex controller is the same for both past participles, in each case the result is different.

(6)



PARTICIPLE$_{FPL}$ ⇐ [CONTROLLER$_{FPL}$ + CONTROLLER$_{MPL}$] ⇒ PARTICIPLE$_{MPL}$

Contexts with feminine closest conjuncts and MPL remote conjuncts constitute the best evidence that the closest conjunct usually triggers agreement.

(7) hauran **fetes**$_{\text{FPL}}$ INJÚRIES$_{\text{FPL}}$ **e** TORTS$_{\text{MPL}}$ als hòmens pobres, humils, dreturers
'they will have done injuries and wrongs to the poor, humble, and righteous men' (*Del gentil*, ed. Bonner 1989: p. 252—OCat)

In (7) agreement stems from only the FPL closest conjunct, not the following MPL remote conjunct. (8) is taken from a pool of examples in which the first conjunct is masculine and the closest conjunct feminine. Even in such cases with pretarget agreement controllers, participial marking often derives only from the closest conjunct.

(8) si tal CONSELLO$_{\text{MSG}}$ & tal MERCE$_{\text{FSG}}$ le ouiere dios **feita**$_{\text{FSG}}$
'if God had given him such counsel and mercy'
(*Fueros de Aragón*, 1247, Madrid: Nacional ms 458, fol. 18^{v}*a*16—OArag)

Textual data show that if two or more potential controllers are singular, then plural number resolution is extremely rare. In cases involving singular conjuncts of the same gender, number resolution would trigger either FPL or MPL marking on a past participle; gender resolution is not at issue. No cases of singular to plural resolution with two or more FSG or MSG conjuncts have been found in Eastern Ibero-Romance.

(9) **Ganada**$_{\text{FSG}}$ a XERICA$_{\text{FSG}}$ & a ONDA$_{\text{FSG}}$ por nombre
'he has won Xerica and Onda by name'
(*Cantar de mío Cid*, 1100?–1210?, Madrid: Nacional ms Vitrina 7–17, l. 1327—OSp)

In (9) only the closest FSG conjunct controls the shape of the past participles. There is no number resolution. A similar result obtains in the Old Catalan text *Tirant lo Blanch* 23 out of 23 times. This same text contains at least eight instances of two or more linked conjuncts which are MSG; in every case the past participle fails to adopt a MPL shape.

(10) lo PARE$_{\text{MSG}}$ e lo FILL$_{\text{MSG}}$ e·l sant SPERIT$_{\text{MSG}}$ he fermament **confessat**$_{\text{MSG}}$
'the Father and the Son and the Holy Spirit have I fervently confessed'
(*Tirant lo Blanch*, 1490, València, fol. Y5^{v}*a*; §478: ¶7/11—OCat)

The three preceding MSG conjuncts in (10) do not bring about plural marking in the past participle. Old Spanish texts show the same phenomenon.

When singular conjuncts are of mixed gender a singular result is virtually assured, and it always obtains if the conjuncts follow the past participle.

(11) as **visto**$_{\text{MSG}}$ en*e*sta comarca vn CAUALL*ERO*$_{\text{MSG}}$ & vna DUEÑA$_{\text{FSG}}$
'you have seen in this region a knight and a lady'
(*Tristán de Leonís*, 1410 ca., Roma: Vaticana MS 6428, fol. 46^{v}*a*30—OSp)

While there may be covert agreement with the msg closest conjunct in (11), resolution is clearly lacking.

Nevertheless, I have isolated one case of singular to plural number resolution in an Old Spanish text.

(12) de su PADRE$_{\text{MSG}}$ & de su MADRE$_{\text{FSG}}$ q*ue* le auja **muertos**$_{\text{MPL}}$
'of his father and of his mother that he had killed'
(*Tristán de Leonís*, 1410 ca., Roma: Vaticana ms 6428, fol. 21^{v}*a*26—OSp)

The conjuncts in (12) are of mixed gender and control MPL agreement. Corbett has concluded that pretarget controllers denoting animates are most likely to take resolved agreement forms. Of course, the singular conjuncts in (12) precede the target past participle and are animate. The two conjuncts straightforwardly convey a unitary MPL sense of 'parents'. In other words, the feature computation required for resolution follows naturally. Until contradictory evidence is found, this permits the following claim.

(13) Singular to plural resolution is possible in object-participle agreement only if the conjuncts precede the target past participle and are animate.

That such conjuncts must precede the past participle for there to be resolution is suggested by a virtually identical expression found in the same ms.

(14) ha **muerto**$_{\text{MSG}}$ asu PADRE$_{\text{MSG}}$ & asu MADRE$_{\text{FSG}}$
'he has killed his father and his mother'
(*Tristán de Leonís*, 1410 ca., Roma: Vaticana ms 6428, fol. 19^{v}*a*22—OSp)

In (14) the same set of following conjuncts do not trigger MPL agreement in the past participle.

Evidence supporting first conjunct control comes from contexts in which the first conjunct is feminine and the closest conjunct masculine. To date I have found only three cases of such agreement.

(15) a. con las COSTAS$_{\text{FPL}}$ & los MENOSCABOS$_{\text{MPL}}$ que ouiesen **fechas**$_{\text{FPL}}$ enel pleito
'with the costs and the damages that they had made in the suit'
(Siete partidas, 1491, Sevilla, fol. 396^{v}*a*37—OSp)

b. la sua PERSONA$_{\text{FSG}}$ e los BÉNS$_{\text{MPL}}$ ha **mesa**$_{\text{FSG}}$ en salvaguarda e custòdia vostra, e a MI$_{\text{FSG}}$, qui só succehïdora en lo imperi!
'his person and his goods has he placed in your safekeeping and care, and me, who am successor to the empire!'
(*Tirant lo Blanch*, 1490, València, fol. O6^{r}*a*; §128: ¶1/2—OCat)

c. dela HONOR$_{\text{FSG}}$ & del BIEN$_{\text{MSG}}$ q*ue* oy eneste dia me aved*es* **dada**$_{\text{FSG}}$
'of the honor and of the good that this day you have given me'
(*Tristán de Leonís*, 1410 ca., Roma: Vaticana MS 6428, fol. 92^{r}*b*34—OSp)

Many examples from Eastern Ibero-Romance, such as (16)a and b, show that this feminine marking is atypical.

(16) a. la CONTIENDA$_{\text{FSG}}$ & ALBOROÇAMIENTO$_{\text{MSG}}$ que don diego lopes auja **tomado**$_{\text{MSG}}$
'the conflict and disturbance that Don Diego Lopes had caused'
(*Crónica de once reyes*, 1252?–1289?, Escorial: Monasterio MS Y.I.12, fol. 226^{r}*b*23—OSp)

b. per recobrar moltes VILES$_{\text{FPL}}$ e CASTELLS$_{\text{MPL}}$ que los turchs havien **conquistats**$_{\text{MPL}}$
'to recover many villages and castles that the Turks had conquered'
(*Tirant lo Blanch*, 1490, València, fol. P8^{v}*b*; §134: ¶34/37—OCat)

Still, because there are several attested cases of a feminine first conjunct triggering agreement, it must be allowed as a possibility and not a mere aberration.

In light of these data, it stands to reason that MPL first conjuncts can trigger agreement as well, as (17)a and b suggest. (Of course, another interpretation for any example with a MPL first conjunct is resolution.)

(17) a. de quants DANS$_{\text{MPL}}$ e TREBALLS$_{\text{MPL}}$ e AFLICCIONS$_{\text{FPL}}$ nos ha **preservats**$_{\text{MPL}}$
'from how many harms and travails and afflictions he has kept us'
(*Tirant lo Blanch*, 1490, València, fol. U3^{r}*b*; §452: ¶9/15—OCat)

b. muchos MALES$_{\text{MPL}}$ & muchos TUERTOS$_{\text{MPL}}$ & DESONRRAS$_{\text{FPL}}$ aujen… **Resçebidos**$_{\text{MPL}}$
'many evils and many wrongs and dishonors had they received'
(*Crónica de once reyes*, 1252?–1289?, Escorial: Monasterio MS Y.I.12, fol. 49^{r}*a*12—OSp)

Tirant lo Blanch contains 10 passages with inflected past participles where the first conjunct is MPL and the closest conjunct FPL. In five cases the past participle is MPL. These are shown in (17)a and (18)a–d.

(18) a. los grans BENEFICIS$_{\text{MPL}}$ e HONORS$_{\text{FPL}}$ que per la mercé vostra he **rebuts**$_{\text{MPL}}$
'the great benefits and honors that because of your grace I have received'
(*Tirant lo Blanch*, 1490, València, fol. S2'*a*; §424: ¶5/10—OCat)

b. los grans SERVEYS$_{\text{MPL}}$ e HONORS$_{\text{FPL}}$ que Tirant li ha **fets**$_{\text{MPL}}$
'the great services and honors that has done for him'
(*Tirant lo Blanch*, 1490, València, fol. S7'*b*; §432: ¶5/8—OCat)

c. innumerables SERVEYS$_{\text{MPL}}$ e HONORS$_{\text{FPL}}$ que lo valerós Tirant ha **fets**$_{\text{MPL}}$
'innumerable services and honors that the courageous Tirant has done'
(*Tirant lo Blanch*, 1490, València, fol. U3'*a*; §452: ¶11/15—OCat)

d. los greus TREBALLS$_{\text{MPL}}$ e CONGOXES$_{\text{FPL}}$ yo he **presos**$_{\text{MPL}}$
'the grave hardships and sorrows I have undergone'
(*Tirant lo Blanch*, 1490, València, fol. F6'*a*; §294: ¶1/2—OCat)

In the five other cases, however, there is FPL agreement.

(19) a. qui tants de BÉNS$_{\text{MPL}}$ e tantes de HONORS$_{\text{FPL}}$ li haveu **fetes**$_{\text{FPL}}$?
'who so many goods and so many honors you have done for him?'
(*Tirant lo Blanch*, 1490, València, fol. Y3'*b*; §215: ¶4/6—OCat)

b. en recort dels TREBALLS$_{\text{MPL}}$ e DOLORS$_{\text{FPL}}$ que **sofertes**$_{\text{FPL}}$ havia
'in remembrance of the hardships and pains that he had suffered'
(*Tirant lo Blanch*, 1490, València, fol. O4'*b*; §372: ¶7/7—OCat)

c. tots los INFORTUNIS$_{\text{MPL}}$ e PERSECUCIONS$_{\text{FPL}}$ que havia **passades**$_{\text{FPL}}$
'all the misfortunes and persecutions that he had suffered'
(*Tirant lo Blanch*, 1490, València, fol. T1'*b*; §438: ¶1/7—OCat)

d. los asenyalats SERVIRS$_{\text{MPL}}$ e HONORS$_{\text{FPL}}$ excelses que… nos ha **fetes**$_{\text{FPL}}$
'the outstanding services and high honors that he has done for us'
(*Tirant lo Blanch*, 1490, València, fol. U3'*b*; §452: ¶9/15—OCat)

e. tantes com CASTELLS$_{\text{MPL}}$, VILES$_{\text{FPL}}$ e CIUTATS$_{\text{FPL}}$ ha **conquistat**$_{\text{MSG}}$ e **tornades**$_{\text{FPL}}$ a la corona del Imperi Grech
'as many castles, villages and cities as he has conquered and returned to the crown of the Greek empire'
(*Tirant lo Blanch*, 1490, València, fol. D7^{v}*a*; §275: ¶6/11—OCat)

Given this combination of conjuncts in Tirant lo Blanch, resolution or first conjunct control thus splits evenly with closest conjunct control.

To this point we have seen one case of gender and number resolution with pretarget controllers in (12), and several possible cases of gender resolution in (18). Consider the four passages in (20).

(20) a. havent molt **festeja's**$_{\text{MPL}}$ lo cèsar al DUCH$_{\text{MSG}}$ de Macedònia e als altres COMPANYONS seus
'the caesar having greatly fêted the duke of Macedonia and his other companions'
(*Tirant lo Blanch*, 1490, València, fol. X3^{r}*b*; §464: ¶4/5—OCat)

b. auie **echados**$_{\text{MPL}}$ d*e*la villa a GAAL$_{\text{MSG}}$ & asus COMPAYÑ*EROS*$_{\text{MPL}}$
'he had thrown Gaal and his companions out of the village'
(*Biblia latina*, 1250 ca. tr., Escorial: Monasterio ms I.I.8, fol. 69^{r}*a*3—OSp)

c. te he **dits**$_{\text{MPL}}$ les AUCTORITATS$_{\text{FPL}}$ e DITS$_{\text{MPL}}$ dels gentils
'I have expounded to you the authorities and quotations of the gentiles'
(*Lo somni*, 1399, ed. Riquer 1959: p. 206, l. 26—OCat)

d. las SENTENÇIAS$_{\text{FPL}}$ & los MANDAMIENTOS$_{\text{MPL}}$: & todas las otras COSAS$_{\text{FPL}}$ que el ouiese **fechos**$_{\text{MPL}}$ como iuez
'the sentences and the commandments and all the other things that he had decreed as judge'
(*Siete partidas*, 1491, Sevilla, fol. 154^{r}*a*12—OSp)

In (20)a and b the agreement controllers are animate, the type more likely to take resolved agreement forms. Moreover, the remote conjunct denotes the associates of the closest conjunct. It is a straightforward matter to view the two conjuncts as constituting a MPL group. On the other hand, (20)c and d are examples of gender resolution with both following and preceding controllers. There is also intriguing homophony between the past participle and the remote conjunct in (20)c.

While I have assumed that (20)a–d are examples of resolution, another logical possibility is that a MPL remote or middle conjunct controls agreement.

In (20)a–c the MPL remote conjunct could control agreement, while in (20)d the MPL middle conjunct could be the controller.

But if such remote or middle conjunct control is possible, then the textual record should contain evidence of such a feminine conjunct controlling agreement. Evidence against remote conjunct control is convincing: no cases have been found in which there is unambiguous agreement between a past participle and a feminine remote object. The phrases in (21) are examples of this.

(21) a. si ha **creat**$_{\text{MSG}}$ pecat$_{\text{MSG}}$ e colpa$_{\text{FSG}}$
'if he has created sin and guilt'
(*Del gentil*, ed. Bonner 1989: p. 235—OCat)

b. auia **auidos**$_{\text{MPL}}$ cinco FILLOS$_{\text{MPL}}$ et tres FILLAS$_{\text{FPL}}$
'he had had five sons and three daughters'
(*Historia troyana*, 1380–1396 tr., Madrid: Nacional MS 10801, fol. 82^{r}*a*5—OArag)

(21)a is either a case of nonagreement or closest conjunct control, while (21b) is either a case of closest conjunct control or resolution.

As with remote conjuncts, nothing supports the notion that feminine middle conjuncts can control agreement. Consider (22a,b).

(22) a. q*ua*ntos RROBOS$_{\text{MPL}}$ & TOMAS$_{\text{FPL}}$ & MALES$_{\text{MPL}}$ auedes **fecho**$_{\text{MSG}}$ enla t*ie*rra
'how many thefts, and takings, and evils have you done on the earth'
(*Crónica de Alfonso X*, 1300-1400, Madrid: Nacional ms 829, fol. 24^{v}*b*23—OSp)

b. lo DISCURS$_{\text{MSG}}$, VIDA$_{\text{FSG}}$ y STIL$_{\text{MSG}}$ que **tengut**$_{\text{MSG}}$ havia
'the discourse, life, and manner that she had had'
(*Tirant lo Blanch*, 1490, València, fol. T2^{r}*a*; §438: ¶2/7—OCat)

In (22)a there is a FPL middle conjunct but no agreement, while in (22)b, with a FSG middle conjunct, there may or may not be agreement with one of the MSG conjuncts.

On theoretical grounds it appears possible to make a argument against remote and middle conjunct control, and for taking the first conjunct as the only individual conjunct besides the closest conjunct which can control object–participle agreement.

Such an account relies on the widely held view in syntax that some grammatical elements move from one structural position to another in the course

	Homogenous gender		Mixed gender	
	FSG + FSG		MSG + FSG	FSG + MSG
	Pretarget	*Posttarget*	*Pretarget*	*Posttarget*
FSG marking	9	14	4	7
MSG marking	0	5	9	2
Total	9	19	13	9
FSG agreement %	100%	74%	31%	78%
Chi-squared test Pretarget conjuncts-—$\chi^2 = 10.54$, $p<0.002$				

Table 1. Object-participle agreement rates with FSG closest conjuncts.

of derivation. Under question here is the movement of complex agreement controllers. Following Kayne (1994) and Smith (1995, 1993), pretarget controllers can be viewed as having moved from a canonical, posttarget position, rather than being base-generated in a preauxiliary position. Such a raising analysis of relative pronoun antecedents and other pretarget controllers means that such controllers are initially to the right of the past participle and that what is a first conjunct in the overt syntax, is a posttarget closest conjunct underlyingly. Combining the tendency for agreement to stem from the closest conjunct with the idea that a first conjunct is actually the closest conjunct in the lower link of a syntactic movement chain, allows the claim found in (23).

(23) A single conjunct can control object–participle agreement only if it is the (underlying) closest conjunct.

In this way, the only individual conjunct, besides the closest conjunct, qualifying as a potential agreement controller is the first conjunct. Middle conjuncts and remote conjuncts are naturally excluded, for at no time in any conceivable derivation are they the closest conjuncts to a past participle. According to this idea, it is also possible to say that those controllers which are closest conjuncts in the overt syntax are more apt to control agreement than those which are only closest conjuncts underlyingly; the latter are syntactically less prominent vis-à-vis the target past participle than surface closest conjuncts, thus accounting for why closest conjunct control is more common than first conjunct control.

We now turn to look at some further evidence of first conjunct control. Since the triggering of agreement by MSG conjuncts is opaque, the control of agreement by MSG first conjuncts can only be shown statistically. The pertinent data are summarized in Table 1, and are taken from *Tirant lo Blanch*, which contains 22 complex controllers whose closest conjunct is FSG in combination with another MSG conjunct.

If MSG first conjuncts do not control agreement, then there should be little difference in agreement rates for complex controllers with only FSG conjuncts and for those of mixed gender. When both controllers are FSG in *Tirant lo Blanch* the rate of participial concord is 82%; the pretarget rate is 100% while the posttarget rate is 74%. But if the first conjunct is MSG and the closest conjunct FSG, then the agreement rate is only 31%. This contrasts markedly with the 78% agreement rate with a posttarget FSG closest conjunct and MSG remote conjunct.

The two agreement rate percentages on the left side of Table 1, 100% and 74%, parallel general nonclitic–participle agreement rates in *Tirant lo Blanch*. So too does the rightmost agreement rate percentage, 78%. But the third percentage, 31%, is markedly different from the other mixed gender case. The dramatic difference in overt agreement rates for mixed FSG and MSG controllers suggests that msg first conjuncts covertly control participial marking a certain percentage of the time, as may be the case in (24).

(24) lo DUCAT$_{\text{MSG}}$ de Macedònia e a MI$_{\text{FSG}}$ ha **lexat**$_{\text{MSG}}$
'the duchy of Macedonia and me has he left'
(*Tirant lo Blanch*, 1490, València, fol. T4'*a*; §443: ¶1/2—OCat)

Let us assume, as Table 1 suggests, that some of the nine MSG past participles in *Tirant lo Blanch* with MSG first conjuncts and FSG closest conjuncts are cases of covert MSG agreement. Let us further assume that the pretarget mixed agreement rate roughly parallels the posttarget mixed rate of 78%. A reasonable estimate means that 10 out of the 13, or 77% of the pretarget mixed passages should be instances of agreement. Since four of these 13 past participles overtly agree with FSG closest conjuncts, this implies that six of the nine MSG first conjuncts covertly control the shape of the past participles, as is possible with (24).

These same data also suggest that MSG remote conjuncts do not control agreement. Table 1 shows that the postverbal agreement rate for two FSG conjuncts in *Tirant lo Blanch* is 70%. The FSG agreement rate with posttarget FSG closest conjuncts and MSG remote conjuncts is 8 percentage points higher. This is additional evidence that MSG and other remote conjuncts do not control agreement. If they did, the posttarget rate of agreement would be significantly below 70%. Furthermore, this evidence argues for masculine first conjuncts triggering agreement more frequently than feminine first conjuncts, an observation which is consonant with grammatical gender dominance.

In conclusion, a single conjunct may control object–participle agreement only if it is an underlying or surface closest conjunct, but especially the latter. In addition, though mixed number and pure gender resolution in object–participle agreement is possible, verifiable posttarget cases are uncommon. But singular to plural number resolution is rarer; controllers may have to be preverbal and animate.

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[1] In examples agreement controllers are in SMALL CAPS and target past participles are in **boldface**; their gender and number are indicated. The *haver/haber* verb form is underlined.

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PRAGMATICS OF ANALYZING COMPOUNDS IN WULFSTAN'S SERMONS

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Motivation of compounds, that is whether the composite structure of compounds is at least discerned and perhaps even relied upon for interpretation, is essentially a pragmatic issue; the question is not whether a given compound can be analyzed—most can—but whether it is analyzed by a speaker/hearer when it is used. While compounds are probably initially coined and interpreted by recourse to quasi generative word-formation rules, over time and with increasing use they enter the lexicon from which they are retrieved through lexical, not generative processes (Brekle 1978). Since both processes presumably produce words, what is needed is some way to gauge whether a word in context is regarded as new and still interpreted by recourse to word-formation rules or whether the word is felt as a moneme and retrieved from the lexicon. This paper represents an initial investigation into the lexical status of compounds in the Old English sermons of Wulfstan, Archbishop of York from 1002–23.[1]

The tools for analyzing historical states of the language are not plentiful or precise, since no native informants are available. But occasionally local clues within a text reassert a compound's original motivation. Just such clues are found in one of Wulfstan's most prominent stylistic devices, the pairing of compounds with other compounds or simplexes that repeat one of the constituents of the compound, as in the pairs *__mans__wican ne __mans__woran* 'evil-deceivers nor evil-swearers' (WHom 8c 162) and *wed__logan__ ne word__logan__* 'oath-liars nor word-liars' (WHom 8c 162-63).[2]

On a general level, such pairs draw attention to the compound structure simply by the proximity of the repetition. On a more detailed level, Wulfstan's pairs induce recognition in a variety of ways that depend on which constituents are repeated. Accordingly Wulfstan's compound pairs can be categorized into five types:

A. Second constituent of one compound echoes the second constituent of another (in*gang*–husl*gang*);
B. First constituent of one compound echoes the first constituent of another (mans*wica*–mans*wora*);

C. First constituent of one compound echoes second constituent of another (*dæd*beta–mis*dæda*);

D. Second constituent of a compound echoes a simplex (gebed*hus*–*hus*);

E. First constituent of a compound echoes a simplex (*cyric*hata–*cyrice*).

As an analysis of each type should show, the morphology of compounds helps explain the distinct ways that each type draws attention to the composite status of compounds.

TYPE A: SECOND CONSTITUENT OF ONE COMPOUND ECHOES SECOND CONSTITUENT OF ANOTHER (WORDLOGAN--WEDDLOGAN). This is the most prominent type in Wulfstan's sermons by almost all measurements. It occurs the most frequently (in some 60 pairs), employs the widest range of distinct compounds (about 90) as well as distinct echoing constituents (about 30). This type is almost always found in highly conspicuous parallel structures employing coordinating conjunctions, anaphora, parallel syntax, and so on, as in *heofon**waru** & eorð**waru*** 'heaven-dwellers and earth-dwellers' (WHom 11 106-07), *freol**stida** & fæsten**tida*** 'feast-days and fast-days' (WHom 13 69) *cyric**sceattas** & leohtge**scota*** 'church-dues and light-dues' (WHom 13 76-77).

There are good morphological reasons for the match between type A combinations and parallel constructions. Such constructions usually link words belonging to the same syntactic and semantic categories, and compounds sharing the same last constituent automatically belong to the same categories. As the head of the compound, the second constituent usually determines the part of speech, inflection, gender, and other syntactic features. The head also names the semantic class of words to which the entire compound belongs as a hyponym. A textbook, for example, is a book, and a *heofonwaru* 'heaven-dweller' is a type of *waru* 'dweller'.[3] Since a common last constituent usually ensures an equivalent syntactic and semantic class, these pairs of compounds come ready-made for parallel constructions.

The artificiality of such closely linked compounds cannot help but draw attention to the compounds and their composite structure. But beyond highlighting the compounds, such pairs may well have occasioned the generation and even coinage of some compounds, which, being new, would almost certainly have been interpreted on the basis of their composite structure. Many of Wulfstan's most tightly joined echoic pairs occur within extensive lists of similar pairs like the following:

Se þe wære wea*mod*, weorðe se geyld*mod*
Se ðe wære hoh*mod*, weorðe se glæd*mod*.
Se ðe wære idel*georn*, weorðe se not*georn*.

Se ðe wære lof*georn* for idelan *weorð*scype,
weorðe se carfull hu he swyþast mæge gecweman his Drihtne.
Se ðe wære ofer*mod*, weorðe se ead*mod* (WHom 10c 125-30).

He who may have been 'gloom-minded,' let him be 'patience-minded'.
He who may have been 'trouble-minded,' let him be 'glad-minded'.
He who may have been 'idle-eager,' let him be 'useful-eager'.
He who may have been 'praise-eager' for idle honor let him be attentive to how he may most please his Lord.
He who may have been proud ('excessive-minded'), let him be humble ('kind-minded').

The tight parallel structure and the incessant repetition of such lists act as a formulaic template with a constant portion (*Se ðe wære* and *weorðe se*) and a variable portion (the compound pairs that change from pair to pair). Compounding offers an obvious expedient for filling these variable slots, since it can readily produce pairs of words guaranteed to fit together. The repetition of *mod* and *georn* in the example above ensures that the compounds can be paired in parallel, in this instance as antonyms. In effect compounding makes the fixed part of the template larger and the variable part smaller. Thus the template could be regarded roughly as *Se ðe wære* ___**mod**, *weorðe se* ___**mod**. In templates like this the constituents of compounds could presumably be interchanged with each other to fill in the variable parts of the formula. So even if Wulfstan did not necessarily coin the compounds in a given pair, he could well have produced them from word-formation, not lexical, processes to fit the formulaic template. Indeed Wulfstan mixes and matches the constituents of the compounds throughout his sermons, interchanging them in several permutations of rhyming pairs.[4]

And this device may well have invited the coinage, not merely generation, of compounds as well. Several hapax legomena occur among Wulfstan's echoing pairs, such as both terms in *freols***brycas** *&* *fæsten***brycas** 'feast-breakings and fast-breakings' (WHom 20.1 98). While the paucity of texts recommends caution in assuming that a hapax legomenon is necessarily a coinage, many of those occurring in Wulfstan's tightly joined echoic pairs are likely Wulfstan's creations, such as *ælmesriht*, *aðbricas*, *wedbrycas*, *manswican*, and *weddlogan*. At least fifteen compounds involved in such systems occur only in Wulfstan's writings or works directly indebted to him. The relatively high proportion of these hapax legomena suggests that such formulaic systems readily prompted the generation and coinage of compounds that by definition would have been perceived as compounds, not monemes.

TYPE B: FIRST CONSTITUENT OF ONE COMPOUND ECHOES FIRST CONSTITUENT OF ANOTHER (*MAN*SWICA--*MAN*SWORA). This type occurs slightly more than half as often as type A combinations (in some 35 pairs), and half of all occurrences are found in non-parallel constructions. Again morphological features help explain why this type occurs less frequently and in proportionately fewer parallel constructions than type A combinations. The constituent which the compounds share is not the head, and so the compounds do not automatically belong to the same semantic and syntactic class. They are therefore less likely to be joined in parallel constructions. Instead the first constituent of a compound, or modifier, usually modifies or characterizes the head in some way (Spencer 1991:210, Brodeur 1959:248). Thus a *godbearn* 'godson' is a *bearn* 'son', not a *god* 'god', but as a specific type of son resulting from sponsorship, it is differentiated from other types of sons (*bearn*) by the modifier *god*. Pairs that share the same first element do not automatically belong to the same class as pairs sharing the same last element do.

But while the common first constituent does not guarantee a common class for the compounds, it can still link them together in parallel constructions. If the heads of the compounds are sufficiently similar to be matched together, a common modifier will reinforce the similarity. The terms *sibb* 'relative' and *bearn* 'son' belong to the same syntactic and broad semantic class, as they both indicate familial relationships, and the first constituent *god* 'god' amplifies the similarity, characterizing each head as a party in sponsorship.

The importance of the common first constituent is even more pronounced in the following passage: *& us* ***un****gylda swiðe gedrehton, & us* ***un****wedera foroft weoldon* ***un****wæstma* 'And bad taxes greatly oppressed us and bad weather very often governed bad harvests' (WHom 20.1 53–54).[5] The heads *gyld* 'tax' and *widere* 'weather' belong to the same syntactic, but not semantic class. Yet the semantic connection is strengthened by the prefix *un-*, which denotes 'bad' for both compounds (bad taxes, bad weather). Thus the modifier cinches an otherwise weak connection between the two simplexes. Even if the heads differ widely, a common first constituent ensures that both heads are at least characterized by the same, sometimes broad, semantic notions. Like Type A combinations, such tightly coordinated pairs draw attention to themselves and perhaps occasion new compounds.

But half the type B combinations occur in non-parallel constructions, distributed throughout the syntax with one compound serving as the subject of a verb, for example, and the other as an object, or one occurring in a main clause and the other in a subordinate. Although the heads are seldom similar, the common first constituent links the compounds and provides continuity over syntactic boundaries, splicing clause to clause, subject to predicate, and so on. In a way, the repetition of the first constituent across syntactic boundaries establishes the theme of the passage, just as the modifier delimits the head within the compound. In WHom 12 36–38, repetition of *woruld* 'world' establishes the domain of discussion in secular, earthly terms rather than religious or divine: *ac fengon to wurðienne æt nyhstan mistlice entas & strece* ***woruldmen*** *þe mihtige wurdan on* ***worulda****felum* 'but at last they received as objects to worship various giants and severe world-men who were mighty in world-power' (WHom 12 36–38). The *woruldmen* are strong (*strec*) and mighty (*mihtig*) clearly in secular terms as opposed to the divine strength and might of the true God.

Perhaps such pairs would not have drawn attention to themselves as readily as more tightly-linked pairs, but still the full stylistic effect is achieved only from recognizing the lexical value of the first constituent, that is from recognizing the composite structure of the compounds.

TYPE C: FIRST CONSTITUENT OF ONE COMPOUND ECHOES SECOND CONSTITUENT OF ANOTHER (*DÆD*BETA--MIS*DÆDA*). This type occurs very rarely in Wulfstan's sermons (in fewer than a dozen pairs) and hardly ever in parallel structures. The infrequency of type C combinations is hardly surprising since the head of one compound must at once serve as the modifier of another. As the head, the repeated constituent encapsulates the word's essential semantic features; as the modifier, it states only the word's contingent features. Type C combinations are difficult to form, especially in parallel constructions, since they suggest that somehow the head is a modifier and the modifier a head. Thus *textbook* and *bookstore* constitute a much less likely pair than say *textbook* and *handbook* or even *bookstore* and *bookbinder* where the repeated constituent performs the same function in each compound.

Yet somehow pairs like *bookstore* and *textbook* still make some sense, even if they probably would not be joined in a parallel construction. The most logical relationship would be 'a bookstore that sells textbooks'. As this relationship suggests, the stylistic effect of such pairing in general is essentially an amalgamation of the three separate constituents forming the two compounds, as illustrated by the figure:

text-book
+ book-store
text-book-store

Or to use an example from Wulfstan,

mis-dæd
+ dæd-beta
mis-dæd-beta

Though *dædbeta* 'penitent' derives from *dædbot* 'penance' (a *dædbeta* is one who does *dædbot*), the echoing pair casts *dædbeta* 'deed-betterer' as an elliptical compound representing *(mis)dæd-beta* 'mis-deed-betterer'. One does penance for, or 'betters,' one's (mis)deeds. In effect, the modifier of the first compound (*mis-*) adds an extra layer of modification as its head (*dæd*) in turn modifies the head of the second compound (*beta*). The pair indeed reasserts the original motivation of the compound, and that is how Wulfstan uses the pair:

> *Understande eac cristenra manna gehwylc þæt þæt forbod huslganges & inganges into cyrican is eal þearflic am* ***dæd****betan, þe ariht understandan can, þæt he hine sylfne on his geðance for his mis****dædan*** *swyðe þreage.*
>
> 'Let each Christian man also understand that the prohibition of the Eucharist and entrance into church is completely necessary for that penitent ("deed-betterer") who knows how to understand rightly that he punishes himself greatly by his own will for his sins ("mis-deeds")' (WHom 15 45–49).

While this type of combination is seldom used, probably because of the morphological, semantic, and syntactic difficulties involved in creating pairs, the few occurrences of this type suggest that one compound draws attention to the composite structure of the other as sort of an oblique gloss, providing additional modification.

TYPE D: SECOND CONSTITUENT OF A COMPOUND ECHOES A SIMPLEX. This type occurs nearly as often as type A pairs (in roughly 55 pairs), but unlike type A combinations, most pairs are found outside parallel structures.[6] Again the morphology of compounds explains why. Since a compound is a semantic hyponym of its own head (a *textbook* is a hyponym of *book*), it would also be a hyponym of the echoic simplex. Thus a type D combination essentially pairs a hyponym with its own superordinate term in a subordinate relationship. Yet parallel constructions posit coordinate relationships. Furthermore some difference must exist between the terms to warrant the inclusion of both, but as a superclass, the simplex would completely overlap the meanings of the compound, making the compound redundant. a pair like *cræft* and *drycræft* 'skill and sorcery-skill' would be puzzling.

If such a pair were forced into a parallel structure, speakers would likely find some way of replacing the subordinate relationship naturally occurring between the terms with a coordinate one dictated by the coordinate structure. And the most likely way of imposing a coordinate relationship would be to posit some difference between the hyponym and superordinate term, so that the superordinate term would not completely overlap the hyponym. In other words, the speaker would probably supply additional constraints to the simplex to make it a sister hyponym subordinate to the same superordinate term as the compound. Wulfstan, for example, pairs *dædan* and *misdædan* in the following passage: *menn swiðor scamað nu* for *godan* ***dædan*** *swyðor onne for mis****dædan*** 'men are greatly more ashamed now for good deeds than for misdeeds' (WHom 20.2 144–46). But the adjective *god* 'good' delimits *dæd* 'deed' just as the first constituent *mis-* does in *misdæd* 'misdeed'. Even if *god* were not explicitly stated, speakers would likely still make sense of the pair by supplying the concept necessary for the implicit contrast.[7]

Outside parallel structures, nothing prohibits subordinate relationships between terms, and that is how most type D combinations are joined. The subordinate relationship is highlighted in *se mæra cyning [Solomon] Gode & Godes folce æt* ***hus*** *to gebed****huse*** *betæhte* 'The illustrious king [Solomon] dedicated that house as a "prayer-house" for God and the people of God' (WHom 18 28–29). Wulfstan explicitly notes that the *gebedhus* became a specific type of the more general *hus* through consecration; the type D combination perfectly suits this logic.

Sometimes Wulfstan uses an echoic simplex within a paraphrase of the compound. In a sense, the simplex names a super-class, and the rest of the paraphrase elaborates the subordinate relationship which makes the compound a sub-class. Such elaboration is illustrated in *weorðaþ on riht****wege*** *& beseoð to eowrum Drihtne, acsiað georne hu betst sy to farenne & farað æfter am* ***wege*** 'be on the right-way and look to your Lord; ask earnestly how best to travel and travel according to that way' (WHom 11 217–19). The phrase *am wege* 'that way' reiterates the compound *rihtweg*, of course, and the preceding clause, *hu betst sy to farenne* 'how it is best to travel' basically paraphrases and explains the modifier *riht*. The 'way' is 'right' because it is the way which is best to travel. As the paraphrase suggests, the *rihtweg* is a subordinate type of *weg*.

It is in such paraphrases that the flexibility of type D combinations is revealed. Whereas combinations of two compounds (types a, B, and C) can draw attention to the composite structure of a compound and invite reanalysis in a general way, a simplex within a paraphrase can more surely point out the direction of the reanalysis. a simplex unfettered by an extra constituent can often reveal the composite structure of a matching compound more precisely and subtly than another compound. In short type D combinations are well-suited for paraphrasing compounds and highlighting their original motivation.

TYPE E: FIRST CONSTITUENT OF A COMPOUND ECHOES A SIMPLEX. This type is less prominent than type D, occurring in about 40 pairs and almost never in parallel constructions, but like type D, it provides a keener instrument for suggesting the relationships between compound constituents than those types consisting of two compounds.

The rarity of type E combinations in parallel constructions again corresponds to the morphological properties of compounds. Because the class of a compound is usually determined by the second constituent, a parallel simplex would belong to the same class as the second constituent, while simultaneously repeating the first, an unlikely occurrence.

The difficulties of such a match are illustrated in: *Wa eow, he cwæð, þe… hwyrfað niht to dæge & dægweorc to nihte, & fyligeað eowrum luste ealles to swyðe* '"woe to you", he said, "who . . . turn night to day and day-work to night and pursue your own desires all too greatly"' (WHom 11 157–60). The chiasmus obviously pairs *niht* with *nihte* and *dæge* with *dægweorc*. But why *dægweorc* instead of *dæg*? Ordinarily the head of this compound would be *weorc*, suggesting that *dægweorc* is a type of work, not day, as reflected in the Dictionary of Old English, 'day's work'. If the head, *weorc*, is substituted for the entire compound—as should be possible with relatively little loss of meaning—a clumsy, almost non-sensical phrase results, 'turn night to day and work to night'. In this context the compound should be interpreted as some sort of day, not work, along the lines of Hall's 'daytime' (1894). The first constituent has to be reanalyzed as the head and the normal morphological structure is discarded. Such reanalyses are rare, however, and so are type E combinations in parallel constructions.

Type E combinations occur more often in non-parallel constructions where the simplex is not required to belong to the same class as the head of the compound, but instead echoes the modifier, thus emphasizing the distinguishing, rather than essential features of the compound. Because the simplex is an independent word performing its own syntactic function, it can often add more information to the modifier of the compound, somewhat like the amalgamated compounds in type C combinations (*mis-dæd-betan*). The context of the simplex is added to the modifier, almost as a paraphrase, as in *he bið swiðe wel þes cynehelmes wurðe gif he mid rihte gehyrð his fæder, æt is, am heofonlican cyninge* 'he is extremely well-worthy of that crown ("king-helmet") if he correctly obeys his father, that is the heavenly king' (WHom 8b 56-57). With an etymological allusion in the tradition of Isidore, Wulfstan suggests that the chrism during the sacrament of baptism betokens the crown that the righteous receive in heaven since crowns, or 'king-helmets', belong to kings.[9] The context of the simplex (*heofonlican cyninge*) adds the heavenly dimension to the compound *cynehelm*, so that the crown in this context is not merely a 'king-helmet,' but a 'heavenly-king-helmet'.

Sometimes the simplex not only adds information to the modifier, but participates in a paraphrase of the entire compound, much like the paraphrases of type D combinations discussed above. Such a paraphrase occurs in

> *Leofan men, ic wille eow nu cyðan ymbe* **cyric***mærsunge, þæt ge e geornor understandan magan hu man* **cyrican** *weorian scyle, þe Gode sylfum to lofe and to wurðmynte gehalgod bið*
>
> 'beloved men, I wish to make known to you now concerning church-praising, that you may understand the more fully how one should honor a church which is hallowed as an honor and tribute to God Himself' (WHom 18 3–5).

Highlighting the motivation of the compound, Wulfstan explains that *cyricmærsung* 'church-praising' consists of honoring (*weorian*) and hallowing (*gehalgod*) a church.

While paraphrases repeating the first constituent (type E) are very similar to those repeating the last (type D), they differ slightly in emphasis. Whereas the paraphrases in type D combinations can be seen to emphasize the subordinate relationship between the simplex and compound, those in type E combinations highlight the way the modifier delimits the head within the compound. Repetition of the modifier focuses attention on how the compound is distinguished from other words of the same semantic class. In the passage above, the paraphrase indicates that *cyric* is the object of *mærsung*; it is a 'church-praising' because the praising, honoring, and hallowing is done to the church, not necessarily inside the church or on behalf of the church to name just two other hypothetical interpretations of the compound. In general type E combinations are well-suited for expressing the relationship between constituents of a compound, emphasizing especially the role of the modifier.

As noted throughout, all the devices remotivate compounds, that is accentuate the composite relationship of the constituents of the compounds, but each type of combination is uniquely suited for particular stylistic effects. The morphological characteristics of compounds enhance a rich and complex device which Wulfstan skillfully exploits for a variety of stylistic effects, effects that depend on the composite structure of compounds.

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[1] The sermons considered in this study are those edited by Bethrum 1957.

[2] All quotes arecored by the *Dictionary of Old English* short title (cf. Healey 1980).

[3] This grammatical and semantic analysis of the head applies only to what traditionally has been called endrocentric compunds (cf. Marchand 1969:13–15 and Spencer 1991:123–56).

[4] For a fuller discussion of such templates and their similarities to oral-formulaic systems see Chapman 1995:123–56.

[5] admittedly *un-* is a prefix, but prefixed words behave much like compounds; Marchand groups both together as 'expansions' (199:129).

[6] A notable exception is the pairs of antonyms formed with Wulfstan's hallmark *un-* compounds, like *can him gescead betweox* **soðe** & *un***soðe** (WHom 9 44) ('[He] knows for himself the difference between truth and untruth).

[7] Of course a simplex contrasted with and *un*-compound, like soðe *& unsoðe* (WHom 9 44) (truth and 'un-truth'), can occur in a parallel construction because the prefix turns the compound into an antonym, not subclass of the simplex, and antimony is a coordinate relationship.

[8] But not impossible. In modern English a number of such combinations can be imagined, such as *chalk and chalkboard, window and windowmaker, toy* and *toy store,* or *bike and bike-rack*

[9] *Cyne,* though not an exact repetition, is probably still a full lexical echo, since it seems to be an allomorph of *cyning* found in complementary distribution as a first constituent of compounds, as Kastovsky (1992:363) has noted.

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THE ETIC-EMIC DISTINCTION APPLIED TO MUSIC ANALYSIS

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INTRODUCTION. When I began the study of descriptive linguistics at the Summer Institute of Linguistics, then held on the campus of Oklahoma University, it was because of my interest in Bible translation. A professional musician at the time, my life had been redirected after serious injury to my hand. Now I changed course and wanted to be part of making the New Testament available to yet one more people whose language had never been written.

As I did the assignments and listened to lectures by Kenneth and Evelyn Pike, Robert Longacre and other linguistics scholars, I began to process linguistic theory in terms of what I knew of music theory. I learned new thought processes for analysis and a systematic means of arriving at decisions when analyzing an unknown language. Music is language in that it is an avenue of communication. It is not speech, unless one is referring to a text sung. It has no lexicon; nevertheless, it is a mode of communication which evokes feelings, emotion. As the philosopher Langer puts it, 'Music is not the cause or cure of feelings, but their logical expression' (Langer 1942:218). Just as speech has boundaries which confine its communicative power to a particular culture, music also has boundaries across which neither its emotional or structural meaning is communicated.

'Music must be domestic to be understood' (Bee-Chenoweth 1968:218). Musical boundaries are wider than those of speech, sometimes encompassing an entire continent with its diverse languages; at other times, it may embrace only a single tribe. In short, music's meaning is by no means universal.

Music is not symbolic of speech. It carries its own meaning within its structure. As I learned how linguists arrived at meaning through phonological and grammatical analysis, I mumbled to myself time after time, 'Just like music.' And yet, I did not know how to transfer the materials of speech to the abstract materials of music. I sought to understand a foreign music system by means of an analysis method which would enable understanding so complete that one could compose idiomatically within that system. There was no precedent for this.

In the 1960's I set about experimenting and analyzing music systems of the Eastern Highlands in what was then the Territory of New Guinea.

THE EMIC DISTINCTION APPLIED TO MUSIC ANALYSIS. The importance of phonemic analysis in descriptive linguistics is generally understood. One forms an orthography and learns to speak an unwritten language on the basis of significant sound units. The subject at hand will deal only with decision-making necessary in establishing the smallest emic unit of music. But first, some misconceptions will be noted. One of these is that a musical pitch is the minimal element of music, and though procedures for interpreting phonemes have been adapted for music analysis, the minimal element of music is philosophically more akin to a morpheme, which carries meaning. Bear in mind that music's significance is synonymous with music's structure. Music, unlike speech, has no referent. 'Music's profundity lies in the musical structuring of an idea. While all people respond in some degree to biological, declamatory, and associative meaning in music, true understanding of what the composer hopes to convey is possible only in terms of structural understanding. Structure and meaning cannot be divorced' (Chenoweth 1972:115).

In linguistics, the distinctive threshold units are exemplified by vowels and consonants given orthographic shapes which comprise an alphabet. In music systems of high cultures, such as European, Chinese, Indian and Javanese, the smallest musical element is a pitch. These significant pitches are referred to in various ways.

In the European tradition, pitches were written on a linear graph whose lines and spaces bore alphabet names: A B C D E F G. For the purpose of sightreading, these pitches also had syllable names: *ut/do re mi fa sol la ti.* Associating each pitch with such a syllable is the practice known as solmization. The pitches of any European scale could be assigned such syllables because its pitches were known.

The music systems of high cultures are literate cultures most of whom have a tempered musical scale. So when a student of Western music, for example, takes a course in music analysis, he is dealing with known elements, and analysis consists of investigating how composers have organized these to create a new composition. Therefore, the experience of most conservatory students is with music's discourse level, which is the subject of inventing or interpreting an aggregate of known elements. These music students are working in only one music system in their preoccupation with melody, harmony, rhythm and form.

European music from the eighteenth century onwards is built upon emic units. The pitches of major and minor scales are the result of scientific tuning. Dividing the octave into approximately 12 equal parts enabled performers to modulate freely among these scales. In this ingenious tuning however, only the octave is acoustically correct. 'Since the frequency of the octave is 2, the frequency of s (semitone) is given by the equation: s12=two' (Apel 1944:735). Expressed as two to the square root of twelve, s=12√2, a semitone is 1.05946, the successive powers of which give the frequencies for the 12 tones of the chromatic scale. However, multiplying 1.05946 times 12 yields an awkward product of 12.71352. It is plain to see that adjustments must be made in the tuning of instruments such as piano and organ, and there are various methods for this. The octave was assigned an artificial measure of 1200 units by Alexander Ellis in the 1800's. By means of it, the acoustic purity of the octave is retained, although other tunings have to be sacrificed. For example, the first overtone, a fifth above the fundamental, deviates by only 2 units, and is not detected by the ear, but the major third above the fundamental is expanded by 14 units. A Frenchman named Savart, who preceded Ellis, assigned 300 savarts to the octave and to each semitone 25 savarts. The unit 'savart,' named for the acoustician, is said to be the smallest pitch interval the average ear can register (Wood 1961:53). The ear can just discriminate an interval of about $1/25$ of a semitone by producing two tones, one held constant while gradually increasing the others. The physicist Alexander Wood is quick to say that outside of the laboratory, pitch discrimination is nothing like that.

The point to be made here is that the ear cannot detect small differences and, in fact, can be trained to adhere to a contrived form of accuracy. Human cultures respond to a range of tonal acceptance. The ethnomusicologist is now presented with two problems: one is that of debriefing from the tunings of his own music system, and the other is that of determining just what is the range of tonal acceptance within a music system. An emic vocabulary is needed. By means of the same tenets for interpreting phonemes, this can be accomplished. Some pitches will have allotones. Thirds and their inversions are expected to be difficult to interpret whereas the second and third partials above a fundamental, that is, the octave and fifth, are ambiguous less often. Working in an emic mode enables the analyst to participate in a foreign music system, imitating the intervals in a recognizable and acceptable manner. Those who are locally regarded as the expert music-makers determine this.

How does one go about an analysis which will result in emic pitches? The first step is to transcribe a corpus of songs which represent every style and category within the particular music system, excluding any songs that might be borrowed from a foreign source. Transcribing is approached objectively, and the simple 5-line staff may be used and supplemented with diacritics to modify pitches not found in equal temperament. Besides these additions, there will also be significant omissions such as clef signs, key signatures and other symbols which represent major and minor scales. The staff, because it is a graph, can accommodate any set of pitches. It has an impressive history, having been developed as early as the 10th century, and European composers have made few changes in it since the 16th century. It is a remarkably flexible system with pitch frequencies plotted on a vertical axis, and time plotted along a horizontal axis. Both pitch and rhythm units can be modified by extra symbols. The advantage of using such a linear graph is that most ethnomusicologists are familiar with it and can both read and transcribe by means of it. Furthermore, it can be easily taught to nationals after their music is emicized. Early analysis became the foundation for constructing the first primer textbooks for teaching music literacy within a music system not previously notated. The first was for the Eastern Highlands of Papua New Guinea and was based on common musical features of 17 language groups (Chenoweth 1980:5). In the North Solomons Province of Papua New Guinea, adults were amazed that they could so quickly handle the materials of their own music system and were setting a vernacular text to melody in 10 days' time (Chenoweth 1995:18).

Common problems encountered in transcribing melodies of pre-literate societies are:

1. Pitches may occur between the chromatic (semitone) series used as a reference.

2. Several renditions of a song may show fluctuation of a pitch.

The analyst must determine whether some pitches fluctuate freely or whether they are the result of some conditioning, either external or grammatical. These are some of the ambiguities that are transcribed etically, i.e. without interpretation.

Once the songs from every style and category are transcribed, is the sum of these pitches a scale? No. This was once thought to be so, but even if all the songs are regularized as to the tonal center, the sum of etic pitches do not comprise the significant pitches in a music system. The ambiguities have to be interpreted before there is an emic inventory of pitches.

There are several reasons for using the term 'inventory' instead of 'scale' to mean the sum of emic pitches operating within a particular music system. It has been pointed out that in some highly literate cultures which have a scientifically conceived scale, the function of each scale degree can be explained. This is not the case with most of the world's music systems, learned orally. Furthermore, the term 'scale' implies that pitches are known entities in any given culture and that these can be identified by local musicians and sung in a successive string. In no song of the 40 or 50 music systems analyzed in

New Guinea and its offshore islands is there an example of all the emic pitches occurring in stepwise arrangement. The music's grammar forbids it.

Even the *Oxford Dictionary of Music* is misleading when a scale is defined as 'a stepwise arrangement of all the chief notes...' (Scholes 1964:509). People of preliterate cultures are not cognizant of music as fragments. Their concept of the minimal unit is a complete song. Even in teaching a song, one is expected to hear it repeated in entirety rather than phrase by phrase. The ethnomusicologist Curt Sachs speaks of a 'scale' as an organic whole 'in which every single note has a function of its own' (Sachs 1961:148). Until the function of each pitch is fully understood, the term 'inventory' is preferred to 'scale.'

Before the ABC's of determining the emic inventory in a music system, a simple but veiled concept must be discussed. It is in fact, a concept basic to emic analysis: What is the minimal element? The music student and layman alike will be quick to answer 'a pitch,' a reply conditioned by one's heritage, where pitches are viewed as minimal units because of the emic scale inherited from European music. however, the minimal element in music is not a pitch but an interval, the dynamic distance between two pitches. One pitch is not music; it must proceed to another pitch, for music is a continuum never static. (In my own case, living in New Guinea and working for years in isolation from other musicians and theorists, it was all joy to later find confirmation of the interval as the minimal element.) In his book *Sound and Symbol* Victor Zuckerkandl says: 'Music actually begins when a second tone has followed the first. The smallest particle of music, then, the musical atom, is not properly the tone but the connection of tone with tone, the interval' (Zuckerkandl 1956:90). Perhaps one has to be a musician to realize how radical is that one concept.

What are the procedures then for discovering emic intervals? From the transcribed corpus, the analyst examines the various manifestations of each interval and contrasts each with any similar interval; for example, thirds are compared not only with other thirds but with seconds and fourths.

One compares similar units within a song to describe fluctuation and compares similar units in separate songs to establish contrast. A rephrasing of basic tenets used in linguistic analysis may be applied to intervals (Pike 1947:73–96, 122–125; Bee 1971:167–169).

1. Two similar etic units which are found in contrast in identical environments are two separate emic units. Musically speaking, environment means the intervals bordering the interval in focus. The like environments must be located in different songs.

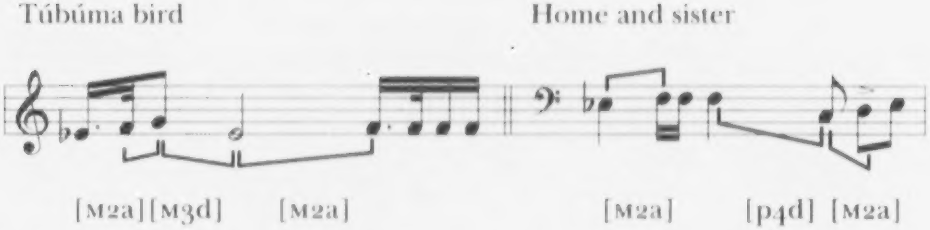

Figure 1. Two similar etic units, major third descending and perfect fourth descending (M3d and p4d), contrast in identical environments and are separate emic units.

All of the examples will be from the music system of the Usarufa people located in the Eastern Highlands of Papua New Guinea. In Example 1, contrast is shown between the two similar intervals of a major third and perfect fourth descending; the ascending counterparts must be examined separately. If two similar intervals are never found in contrast, they are two manifestations of a single interval. Thus:

2. Two similar etic units found in free (unrestricted) fluctuation, where one may substitute for the other without qualification and in all circumstances, are variants of a single emic unit.

Free fluctuation was not found in Usarufa music. Instead, myriad examples occurred of conditioned fluctuation.

3. Two similar etic units found in conditioned (restricted) fluctuation, where the two are mutually substitutable under certain conditions, and where the two do not contrast in any circumstance, are variants of a single emic unit.

What are some common conditioning factors in this and other music systems?

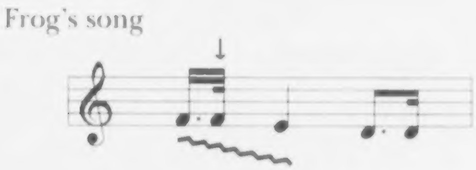

Figure 2.

a) A weak rhythmic position tends to drift in the direction of the next, stronger interval. This accounts for many etic microtones in the system.

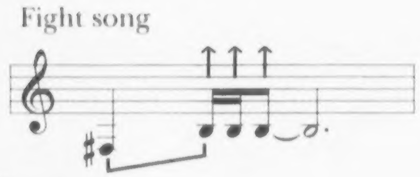

Figure 3.

b) The beginning phrase, initiated by a song starter, is often unstable in oral traditions and is a conditioning factor. Its tonality settles as the song continues.

c) In an upward leap, the interval has a tendency to expand.

d) In Usarufa song there is a tendency to drift upward on a sustained note. Other features which may condition fluctuation are external:

e) The old age of a singer may make his voice unsure;

f) General excitement such as that which mounts during the singing of a victory song, may cause an upward drift;

g) A change of vowels from front to back or the reverse may influence tonality; or

h) Interchange between chorus and a solo voice may modify the tonality. All of these are commonplace.

4. Two similar etic units found in conditioned (restricted) fluctuation, where the two are mutually substitutable under certain conditions and where the two are found in contrast elsewhere, are two separate emic units despite the fluctuation.

5. The final tenet makes provision for dissimilar environments: Two etically similar units found in complementary distribution, where one occurs in an environment different from the other, are variants of a single emic unit.

Such complementary distribution may be found in analysis at a higher level when elements are seen relative to a tonal plan. For instance, in Usarufa music, all seconds whose lower pitch is tonal center are major seconds in women's songs. In songs other than women's songs, seconds whose lower pitch is tonal center are minor seconds. Because their distribution is mutually exclusive, all manifestations of seconds above tonal center can be expressed in terms of one emic symbol:

/2H/ = [M2a] ; [M2d]
[m2a] ; [m2d]

In the end, 25 etic pitches in Usarufa were reduced to eight emic pitches.

After the resolution of ambiguities by emic interpretation, intervals are seen as discreet units; their end points are established as pitches when related to a tonal center. In Western terms, tonal center is aptly called the 'key'. Every musical composition has a tonal plan. 'Tonality gives the dynamic force and organization to syntax' (Chenoweth 1979:140). All pitches relate to tonal center in their progression and degree of attraction. Tonal center may be likened to a predicate in music's grammar. By grammar is meant 'the consideration of how emic units within a tonal plan are distributed in relation to each other and in relation to larger units of which they are components' (Chenoweth 1979:140).

In the description of a music system, terms such as 'major', 'minor' and 'perfect' do not refer to Western theory but refer to an acoustic distance with which the analyst is already familiar. Thus, a pitch labelled M2H signals a pitch the acoustic approximation of a major second above tonal center, whereas a pitch a major second below tonal center is labelled M2L. These symbols are not to be confused with M2a and M2d referring to etic intervals ascending or descending in concatenation. The Western musician is already trained to read, hear and sight-sing these distances. One could invent new labels to emphasize the fact that a music system other than the major-minor one is under scrutiny, but the pragmatic value, as with retention of the linear staff, is obvious on two fronts:

1. The analyst need not be burdened with learning a new vocabulary and/or notation system. The creation of a new one is apt to so engross one in technology that field work is undervalued or even dismissed.

> '...no matter what the electronic medium, the information in transit must eventually terminate in the human brain. The ultimate connection is mind to mind, not computer to computer.' (Harker 1995:5)

2. Another pragmatic benefit lies in the solmization of these distances in the teaching of nationals to read and write their own music system (Chenoweth 1994:18).

'When emic elements relate to one another in a prescribable ordering, a system is evident' (Chenoweth 1980:6). A music system may be defined as a culturally contained musical universe whose elements are related to one another, and whose elements act as components in larger contexts—such as motifs, sequences, scales, phrases, periods, and form—all of which function according to an established network of controls. These controls are rarely, if ever, expressed verbally in an oral tradition even though they are operative (ibid).

Conclusions derived by means of etic-emic analysis are not final until checked with the local music-makers. It must be said that the checking of all intervals in their emic environments is a task best accomplished using the vernacular language. If the ethnomusicologist has not learned the language, he does well to work with a linguist who is conversant in the language. Even then, it is never easy to explain how the method of testing has anything to do with singing songs. The linguist must explain that the music expert is to repeat exactly what is sung to him. This makes no sense to a people who does not think of song in terms of fragments or particles. Without careful explanation and demonstration, the local singer will be unable to respond in kind. He may simply sing through an entire song which is unrelated to what was sung to him for imitation.

Having checked the interpretations, transcriptions are rewritten emically. The syntax of each song is expressed by an intervallic succession list, a flow diagram and an emic formula, three tools which will aid one in generating new melodies in the system, so the task of analysis is far from finished even after the emic pitches have been discovered.

'Tonal systems are discovered in the realm of the audible; they are not inventions', wrote Zuckerkandl, and 'in tones and tonal forces man discovers an original and infinitely fruitful material for his creation of images and his thinking in images' (1956:375–6).

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PITCH ACCENT, *CYNGHANEDD*, AND NOTIONALISM

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1. Notionalism. In his *Philosophy of Grammar*, Otto Jespersen distinguished between grammatical categories developed from the analysis of a language as 'formal' and those based upon logical or 'natural' extralinguistic factors as 'notional'. In the latter case, those engaged in creating general or philosophical grammars were unfortunately 'too often under the delusion that Latin grammar was the perfect model of logical consistency, and they therefore laboured to find in every language the distinctions recognized in Latin' (Jespersen 1924:47).

As we are well aware, notionalism lives on in many English classes. For example, students are often still taught that they are to never split an infinitive, because in Latin it was impossible; and they are taught that a preposition is something one cannot end a clause with, because the classical concept of a preposition is something that must be (by its very Latin name) 'pre-posed'.

The concept of notionalism, however, even enters into our thinking in linguistics, because we, like the philosophical grammarians before us, know certain languages very well and are influenced by them in our analyses of other languages. While we may dismiss notions derived from Latin, we are perhaps tacitly more accepting of treating categories and relationships from English as though they were part of some 'universal grammar'.

Nor is this notionalism—believed to be logically universal or even derived from extralinguistic bases found in the real world—restricted to the categories of grammar. One such case appears in the phonology of Welsh and its application to poetry.

2. Pitch and stress accents in Welsh. As pointed out at last year's Forum (Griffen 1996), Welsh maintains two separate systems of accent in words of more than one syllable: stress and pitch. The main stress accent normally occurs in the penult, and the main pitch accent occurs in the ultima. Thus, in a word such as *darganfod* [dar gan vod] 'discovery' the penult [gan] is pronounced with the stress accent, while the ultima [vod] is pronounced with the pitch accent. Of course, in monosyllables the stress and pitch accents coincide. (Compare especially Morris Jones 1913, Jones 1949, Watkins 1961, Griffen 1979, Williams 1989.)

In the phonological system of Welsh, the stress accent motivates certain rules while the pitch accent motivates others. For example, in some words the aspirant [h] occurs in the stress-accented syllable and not elsewhere, as in the alternation between *brenin* [bren in] 'king' and *brenhines* [bren hin es] 'queen'. On the other hand, the vowel y [ɨ] (or in some dialects [i]) in the pitch-accented syllable alternates with schwa [ə] in other syllables, as in the alternation between *mynydd* [mə nɨd] 'mountain' and its plural *mynyddoedd* [mə nəð oið].

While there is no particular reason to assume from such examples that one system is primary and the other ancillary, the assumption among linguists has been that stress accent is indeed primary, as, for example, in Jones 1949 and Watkins 1961:26–31. In fact, pitch is not even mentioned in King 1993 or in Thorne 1993, and there has even been some attempt in the most modern approaches to phonology to subsume pitch accent under stress accent (compare Williams 1989:7–9, 228–33). The question is: Is this assumption based upon the analysis of the language—is it formal—or upon influences from other languages—is it notional?

3. THE FOUR STRESS-BASED RULES OF CONSONANT CORRESPONDENCE. To answer this question, let us examine *cynghanedd* ('correspondence') poetry, in which consonants correspond in complex patterns of alliteration from one part of the line to another. For example, in the following line the consonants in the first half-line correspond consecutively with the consonants in the second half-line:

bradwyr a droes brwydr a drwg
br d r dr s | br dr dr g
(Rowlands 1976:xxix)

As in the phonology in general, the traditional view of consonant correspondence in *cynghanedd* poetry follows rules of stress accent. Rowlands describes the rules as follows:

> *Emphasis and consonantal* correspondence: the line is divided into two parts, each ending in an emphasized word (and it should be noted that words not normally stressed, such as prepositions, can be emphasized for this metrical purpose at the end of the first part of the line). Consonants correspond absolutely, in order, in each of the two parts of the line, before the accented vowel of the emphasized word. If the word has more than one syllable, and is accented on the penultimate syllable, the consonant(s) between the accented penult and the unaccented last vowel must be taken into account. Words in Welsh are either (1) monosyllables or

> polysyllables with the last syllable accented or (2) polysyllables with the penultimate syllable accented. It follows, therefore, that there are four possible classes of consonant correspondence: with both emphasized words similarly accented (*cytbwys*) or differently accented (*anghytbwys*), and the last emphasized word in the line ending in an accented syllable (*acennog*) or in an unaccented syllable (*diacen*).
>
> | | | |
> |---|---|---|
> | 1. *cytbwys acennog* | ´ | ´ |
> | 2. *cytbwys diacen* | ´ ˘ | ´ ˘ |
> | 3. *anghytbwys acennog* | ´ | ´ ˘ |
> | 4. *anghytbwys diacen* | ´ ˘ | ´ |
>
> In 1, 2, 3, 4, the consonants correspond in front of the accent. In 2, 3, 4, the consonants also correspond after the accent. In 1 the consonants to not correspond after the accent, as this would mean that the two emphasized words would end in identical consonants. This might not be wrong in all cases, but rhyme (*odl*) must be avoided as must *proest* (half-rhyme, where the consonants are identical and the vocalic elements belong to the same class). It is a general rule that *odl* and *proest* must be avoided between the emphasized words in a line of *cynghanedd*. (Rowlands 1976: xxviii–xxix)

(For further information on the rules of *cynghanedd*, see Loth 1900, Morris Jones 1925, Parry-Williams 1936, Roberts 1973, and Rowlands 1976.)

The traditional rules basing the distribution of consonant correspondence on stress create a very complex situation, yielding up to four sets of variants for each type of line that can occur in *cynghanedd* poetry. Moreover, rule 1 is treated differently from rules 2, 3, and 4. To make matters even more complicated, there is a 'fault' in *cynghanedd* called *crych a llyfn* 'wrinkle and smooth' which occurs 'when a consonant is misplaced in relation to the accent of one of the emphasized words:

calon engylion Englont 2.7
ng´l˘n | ´ngl˘nt
(Rowlands 1976:xlvi)

4. THE SINGLE PITCH-BASED RULE. If, however, we base the consonant correspondence not upon the stress accent of the penult, but upon the pitch accent of the ultima, the entire complex system can be accounted for quite simply as follows:

> Consonants correspond absolutely, in order, in each of the two parts of the line, before the pitch-accented vowel of the emphasized word.

Through this single pitch-based rule, we can eliminate all of the complexities involved with the four traditional rules, treat all lines and all types of words the same, account for prepositions (and other normally unemphasized words) at or before the position of emphasis, require no part of the rule to contradict another part, and obviate the very notion that *crych a llyfn* is a 'fault' at all.

Of course, the single pitch-based rule must logically apply in all instances in which the complicated stressed-based rules apply. Let us examine four representative lines each corresponding to one of the four rules noted above:

1. *cytbwys acennog*
i olau'r cwyr i lawr Caint
l r c´r l r c´nt
(Rowlands 1976:xxix)

2. *cytbwys diacen*
gŵr bellach a grybwyllir
g r b´ll˘ch l gr b´ ll˘r
(Rowlands 1976:xxx)

3. *anghytbwys diacen*
di-brid y daw i brydydd
d br d l d br´d˘dd
(Rowlands 1976:xxx)

4. *anghytbwys diacen*
rhyswr cwncwerwr can caer
c nc´ r˘r l c n c´ r
(Rowlands 1976:xxxviii)

As Rowlands points out (as cited above), in the old rules 'In 1, 2, 3, 4, the consonants correspond in front of the accent'. As stress accent precedes pitch accent, this would necessarily lead to correspondence before the pitch accent as well. Moreover, it would also predict the correspondence before the pitch accent in 2, 3, 4 as a natural consequence—something the traditional rules must handle explicitly: 'In 2, 3, 4, the consonants also correspond after the accent'. Finally, the traditional approach requires one more rule stating 'In 1 the consonants do not correspond after the accent, as this would mean that the two emphasized words would end in identical consonants'. There is no logical reason even to point this out in the pitch-based rule, since we are dealing only with the correspondences before the final syllable, anyway. The added complexity in the traditional rules is that, in effect, an exception has already been made that requires another rule to block the exception's rule—a rather complicated situation indeed.

In addition to its logical applicability in a far more elegant manner to all the lines covered by the traditional rules, the new single rule applies in at least one 'fault' in the traditional rules. As in the example of *crych a llyfn* cited above, the traditional rules fail to account for the pattern because a correspondence occurs between a consonant before the stress accent and subject to the rules and a consonant after the stress accent and not subject to the rules. Since both consonants occur before the pitch accent, they are naturally covered by the new rule.

For the linguist, the single pitch-based rule is superior to the traditional stress-based rule because it satisfies the criterion of Occam's Razor and works more simply and directly. Of more crucial importance though is the *crych a llyfn*, in which the traditional rules do not in fact work at all and in which the new rule does work with no added complexity. The single pitch-based rule is thus not only more elegant than the traditional rules, but it is more efficacious as well.

5. CONCLUSION. At this point, one aspect of this analysis must be terribly obvious. We cannot simply designate the stress accent as the primary accent for the phonological application in *cynghanedd* poetry. And if we cannot make this assumption in an application, we certainly cannot make it with regard to the phonological system of Welsh in general.

From a comparison of the two rules, it is evident that for at least those who devised the system, the single rule based upon pitch was very much in effect. Of course, for poets today under the influence of the bardic grammarians, it may well be that the complicated stress-based rules are being followed.

Of course, we may well wonder why if the pitch-based rule is so simple and straightforward, bardic grammarians have assumed that *cynghanedd* be based upon rules of stress accent. Indeed, some of the grammarians themselves have been accomplished poets, and the thought that they would overlook the simple rule that must originally have formed the basis for their own approach to the poetry and that they would proclaim rather the complex and inconsistent rules of stress accent in their approach to the grammar is rather startling.

The answer to this riddle quite clearly lies in notionalism: With the influence of Latin poetry, in which stress accent determines metrical patterns, and with the dominance of English, the poetry of which is marked by a heavy stress accent or beat, it is little wonder that it has been especially the well educated Welsh grammarians who have taken the poetry composed with the pitch accent and who have made it conform with the Latin concept of meter and with the English realization of beat, regardless of how convoluted such a conformity must be.

But it is not just the bardic grammarians who have fallen into the trap of notionalism. Such thorough, modern, linguistically based grammars as King 1993 and Thorne 1993 fail even to mention that there is a pitch accent at all. As excellent a linguist as Briony Williams attempts to subsume pitch accent under stress accent in her metrical phonological analysis in *Stress in Modern Welsh.*

Rather than snickering at English teachers who insist upon unsplit infinitives then, perhaps we need to examine our own practices more closely. At the very least, we should dust off our copies of *The Philosophy of Grammar* and contemplate anew the words of Otto Jespersen.

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AN ACOUSTIC PHONETIC EXPLANATION FOR CROSS-LANGUAGE PATTERNS IN LABIALIZATION

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INTRODUCTION: The goal of this paper is to examine some universals concerning secondary articulations and to provide an explanation in terms of an acoustic phonetic model proposed by Gunnar Fant.

Secondary articulations are those with a lesser degree of constriction accompanying an articulation with a higher degree of articulation. It is usually understood that the secondary articulation is like an approximant and the primary articulations are most frequently stops and less frequently fricatives. The timing of secondary articulations is regarded to be simultaneous with the primary articulations. Since approximants lack definite acoustic boundaries as in stops and fricatives, the total time would nevertheless be closer to a single consonant articulation rather than a stop and approximant sequence.

The types of secondary articulations involve the raising of the tongue body towards the palatal or velar area, retracting the root of the tongue towards the pharynx, and rounding or protruding the lips. These types are labeled as palatalization, velarization, pharyngealization, and labialization respectively. An additional secondary articulation is formed by the combination of labial rounding and velarization and hence is labeled as labial velarization.

The most frequent type across languages is labialization with the others occurring much more rarely. Languages from the Caucasian and some from the Australian language groups allow labialization on a wide range of consonants according to place of articulation, i.e. (from labial to uvular). However, most languages, velarization is found mainly with velar and uvular places of articulation. Ohala and Lorentz (1977) tabulated the number of labialized consonants by place of articulation from the phonetic inventories of Ruhlen (1976). They showed that the incidence of labialization increases from the labial to the velar and uvular region. Their counts were as follows: 48—labial, 26—dental, 16—alveolar, 43—palatal, 318—velar, 107—uvular and 26—glottal or pharyngeal across 706 languages. Many of the glottal consonants were recorded as [hʷ] in the inventories which could be an indirect way of encoding the voiceless labial velar approximant [ʍ] and therefore many of these would not be velarized glottal fricatives. In terms of the number of languages containing these labialized segments, the counts are as follows: labial—16, dental/alveolar—12, palatal—13, velar—132, and uvular—41.

CROSS LANGUAGE DATA: Two major sources for a survey of phonetic type were Maddieson's *Patterns of Sounds* (1984) and Ruhlen's *A Guide to the Languages of the World* (1977). Questions of phonetic detail arising from some omissions were answered from Ladefoged and Maddieson's recent work, *The Sounds of the Languages of the World* (1996). Maddieson's work consists of 317 phonetic inventories from all language families. Lists of the languages that contained each phonetic type were made and generalizations based on description statistics and phonetic typology were made. Ruhlen's books mainly consist of 706 phonetic inventories with a general genetic classification of languages and comments on a few areal, genetic and some typological features for the large groupings.

In Maddieson's data only 8 out of 94 stops were labialized non-velar or non-uvular stops. So most of the observations for his inventories pertain to the velar and uvular stops. In order to formulate implicational universals about these stops the presentation of counts in tetrachoric tables as suggested by Croft (1990) are used. Croft's tetrachoric tables derive from the truth-tables in symbolic logic. The truth-table of interest is material implication defined as follows:

p	→	q
True	True	True
True	False	False
False	True	True
False	False	True

where $p \rightarrow q$ means if p then q and all combinations of true and false for p and q given the value of the complex statement in the center column.

The analogous pattern for typology is for example:

k^w	→	k
yes	yes	yes
yes	no	no
no	yes	yes
no	no	yes

where 'yes' under [k^w] and [k] means the phonetic type of interest is attested in one or more languages. The 'yes' in the center column means that the combination of [k^w] and [k] are found in one or more languages, or the combination of no, yes means that there are languages with no [k^w] but with a [k]. Croft prefers to put this in a tetrachoric table:

	k^w	**no k^w**
k	yes	yes
no k	no	yes

It is assumed the function of the labialized consonants are distinctive in each phonological system. Other functions of labialization have been recognized in phonetic systems. The enhancing feature of rounding in English increases the perceptual distance between the sibilant pairs of [s] and [ʃ]. The rounding of the lips in the production of [ʃ] lowers the center of gravity of the spectrum of [ʃ] and thus makes it more distant from [s] than if it had no rounding. Also the anticipatory rounding of consonants before [w] or [o] due to coarticulation effects performs no distinctive function in English, although it may have a minor syntagmatic (organizational) role to play.

With the distinctive function in mind we may look at the tetrachoric tables from Maddieson:

	k^w	**no k^w**		**q^w**	**no q^w**
k	38	245	**k^w**	9	0
no k	0	2	**no k^w**	0	279

All k^w's are properly included in the set of k's and similarly all q^w's are included in the set of k^w's. Two universals may be proposed:

1. k^w → k
2. q^w → k^w

Similarly, the pattern of proper set inclusion holds for the following:

3. q^w (9) → q (38)
4. k'^w (18) → k' (49)
5. q'^w (8) → q' (19)
6. $ɢ^w$ (4) → ɢ (8)

The number of languages are in brackets after each symbol.

In the fricative class 5 out of 32 labialized fricatives are not in the velar or uvular class. The tetrachoric table for [x] and [x^w] indicates that an implicational statement cannot strictly be formulated.

	x^w	no x^w
x	18	58
no x	2	238

Even though there are two counter examples to the universal $x^w \rightarrow x$, there is a high association between [x] and [x^w] as measured by a χ^2 test i.e. $\chi^2 = 520.84$ $p<0.001$. However the universal x^w (19) → x^w (18) holds since all nine languages are a subset of the 18 languages that have [x^w].

Ruhlen's data from 706 languages indicate much more labialization of stops or fricatives outside the velar and uvular place of articulation than does Maddieson's. A count of 164 languages contains velars and uvulars and 38 languages contains labialized consonants at other places of articulation. This may be partly due to a large number of languages that already have a more extensive labialization across places of articulation such as the Caucasian languages, some Austro-Tai and Indo-Pacific languages. However, the main characteristics of labialization still hold as shown in the tetrachoric tables below:

	k^w	no k^w
k	124	580
no k	0	2

	q^w	no q^w
k^w	39	73
no k^w	2	595

Ruhlen's data contains two exceptions to the implicational universal $q^w \rightarrow k^w$. If the fricatives are considered in these exceptions they both have [x^w] in their inventories. Thus, the universal will have to be extended to the labialization of obstruents, i.e. if a language has a labialized uvular obstruent, it will have a labialized velar obstruent.

VOCAL TRACT MODELS. The universals $k^w \rightarrow k$, and $q^w \rightarrow q$ state that [k] and [q] are 'hosts' for labialization. The universal $q^w \rightarrow k^w$ implies a hierarchy or scale of preference for labialization, i.e. [k] is more preferred than [q] for labialization. From the table of incidence of labialized consonants according to place of articulation recorded by Ohala and Lorentz (1977) the preference hierarchy is:

velar > uvular > palatal > labial > dental > alveolar

where the sign '>' means 'preferred to'. Why is there the above order of preference? In answering a different but related question, Ohala and Lorentz (1977) suggested from Fant's tube model for formant frequencies that a constriction at a velocity maximum (pressure minimum) of a standing wave in a uniform tube has the effect to decrease the resonant frequency under consideration. For the second resonant frequency, the velocity maxima are at the lips and near the velar region. A more refined model was constructed by Fant (1960) based on X-ray photography.

The vocal tract cross-sectional areas are constructed for each centimeter as one moves from the glottis to the lips as in the figures 1 and 2 below:

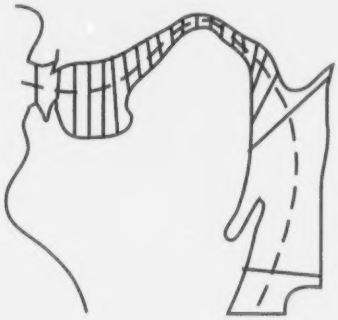
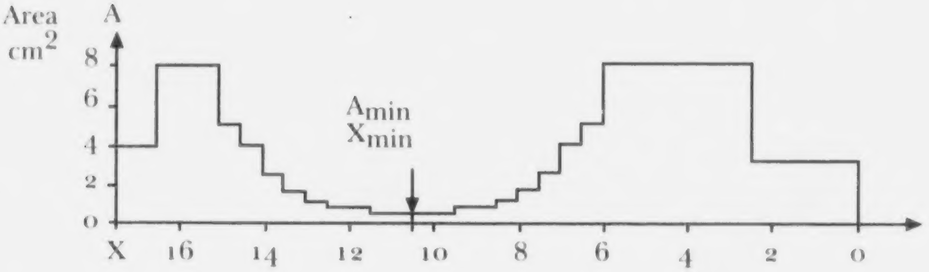


Figure 1.



X=Constriction coordinate in cm from glottis

Figure 2.

This is called a three-parameter vocal tract where L/A is the lip protrusion/area of lip rounding, A_{min} is the area of maximum construction and X_{min} is the place of constriction. Fant electronically generated the first five resonant frequencies for a set L/A value, a fixed A_{min} value and a varied X_{min} from

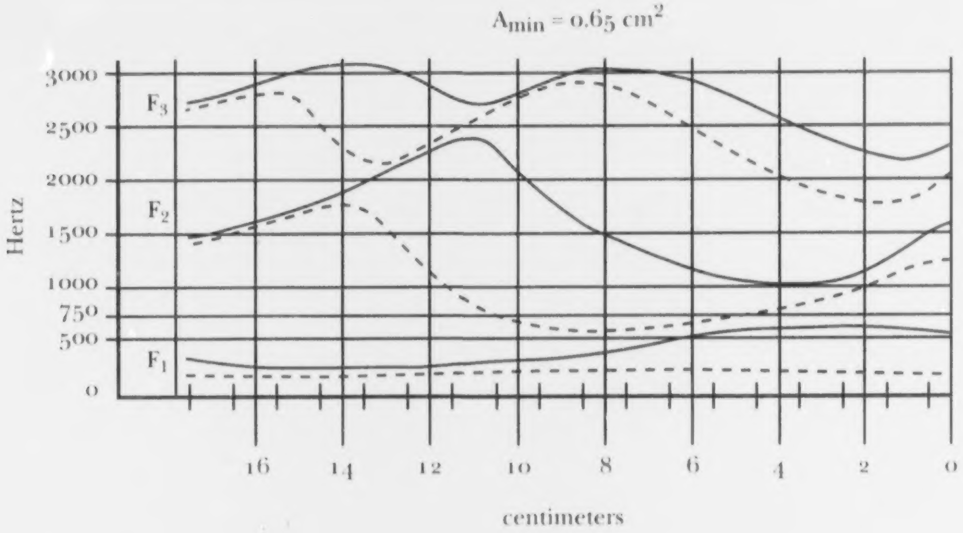


Figure 3.

the lips to the glottis. The results for the first three formants (F1, F2, F3) are represented in figure 3, called a nomogram.

For each formant or resonant frequency there are two curves. The solid curve represents $A_{min} = 0.65$ cm^2 with no lips rounding and protrusion. The dotted curve represents the corresponding formant value with the same A_{min} but with the lips protruded 1 cm and area of lip rounding being 0.16 cm^2.

A velar articulation is 11 cm from the glottis. Here we see that the greatest acoustic change in formant 2 (F2) takes place. Roughly a change of 1600 Hz. The uvular articulation is at 9 to 10 cm from the glottis. A change in lip rounding produces a 1000 Hz change and even in the palatal region, a formant 2 will change roughly 400 to 500 Hz. With lip rounding in the alveolar region, $X_{min} = 14$ cm, lip rounding produces a slight effect in F2 and a 500 Hz effect in F3. Since pitch perception is roughly logarithmic, a change in higher frequencies is a smaller change perceptually than an equivalent change in the lower frequency range. So F3 change would not be as effective as an equivalent F2 change in the lower freuency range. Curiously, with $X_{min} = 0$, i.e. constriction at the lips, lip rounding and protrusion produces no effective change in F2. Consequently, the extent of the F2 changes for X_{min} at the velar, uvular and palatal correlates with the hierarchy of labialization cross-linguistically mentioned above. That is to say, the most effective change acoustically produced by lip rounding is in the velar area, next the uvular and then palatal. Since the host consonant for palatals are much rarer cross-linguistically 52/317, the incidence of labialized palatals should be proportionately rarer as compared to [k], 283/317.

One puzzling question is why are there recorded labialized labials, dentals and alveolars since the model predicts very little acoustic change due to lip rounding? I would propose that the essential secondary articulation is not labialization but velarization or more precisely labial velarization. If one tries to produce a [p] and a labialized [p] just by protruding one's lip but not retracting the dorsum of the tongue to the velar region there is indeed a negligible acoustic effect. The velarization is essential.

As a post-script, this conclusion is reflected in the English alphabet. The letter 'q' encodes the sequence [k^w] inherited from many Latin words but found in simple English words like *quick*. However, other combinations such as [t^w] do not have such status because of their low frequency and [p^w] with negligible frequency.

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COMPARISON OF DIRECT OBJECTS IN MANDARIN CHINESE

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LI AND THOMPSON (1981:564) claim that when the comparative construction of superiority (i.e. more than the other) is used in Mandarin Chinese, the following formula should be used with *bì* as the comparison word as shown in (1):

X comparison word Y (adverb) dimension

(1) ta bì nì gao (ibid:564)
3sg COMP you tall
S/He is taller than you are.

They (ibid:571) point out that the dimension which specifies the standards of comparison must be characterized by the verb phrase, and that only verb phrases which can be quantified or measured by *hen* 'very' can be used in the comparative construction. Two types of verb phrases are included: nonactivity verbs, either transitive, such as *xìhuan* 'like', or intransitive, such as *hao* 'good' and verb phrases which contain measurable adverbs, such as *zao* 'early'. They provide the following examples to demonstrate the use of the formula (ibid: 565–68):

(2) ta bì nì danxiao
3sg COMP you timid
S/He is more timid than you are.

(3) ta bì nì xìhuan Zhangsan
3sg COMP you like Zhangsan
S/He likes Zhangsan more than you do.

(4) ta bì wò zao lái
3sg COMP I early come
S/He arrived earlier than I did.

(5) qù bì bu qù hao
go COMP not go good
Going is better than not going.

(6) Zhangsan pao de bì nì (pao de) kuài
Zhangsan run CSC COMP you run CSC fast
Zhangsan runs faster than you do.

(7) wò bì zuótian shufu
I COMP yesterday comfortable
I feel better than (I did) yesterday.

(8) ta bì wò wan chi-fàn
3sg COMP I late eat-food
S/He eats later than I do.

(9) xiàng bì xióng bízi cháng
elephant COMP bear nose long
Elephants have longer noses than bears.

(10) jintian bì zuótian rè
today COMP yesterday hot
Today is hotter than yesterday.

(11) bàozhi Xìnmei bì wò niàn de kuài
newspaper Xinmei COMP I read CSC fast
The newspaper, Xinmei reads faster than I do.

Li and Thompson (ibid:569) further claim that only subjects and topics (*X*, *Y*) can be compared as shown in the above examples, and that direct objects cannot be compared by using the formula, as in (12), unless the ideas 'I like dogs better than cats' conform to a complex stative construction, as illustrated in (13).

(12) a. *wò xìhuan gòu bì mao
I like dog COMP cat
b. *wò gòu bì mao xìhuan
I dog COMP cat like
c. *gòu bì mao wò xìhuan
dog COMP cat I like

(13) *wò xìhuan gòu* bì *wò xìhuan mao* xìhuan de duo
I like dog COMP I like cat like CSC much
I like dogs better than cats.

In the examples provided by Li and Thompson (ibid:564–568), there are only three cases in which transitive verbs are used, as in (3), (11), and (13). One transitive verb, *niàn* 'read', is used with an adverbial modifier in (11), but only subjects are compared. *Xìhuan* 'like', a nonactivity verb, is used in (3) and (13). Only in the latter direct objects are compared, and the complex stative construction is used.

In order to examine Li and Thompson's argument (ibid:570) that direct objects cannot be compared in Mandarin Chinese unless the complex stative construction is used, we need to look at the two transitive verbs in their examples first. As claimed by Li and Thompson (ibid:568), verbs in a comparative construction must be able to be quantified or measured by the adverbial intensifier *hen* 'very'. Although the two transitive verbs, *xìhuan* 'like' and *niàn* 'read' meet this condition, Li and Thompson (ibid) fail to point out that these two verbs are modified by *hen* in different ways. Like other stative verbs (Quirk et al. 1985), *xìhuan* must have the intensifier *hen* placed directly before it in a noncomparative sentence to show the degree of intensity of the verb phrase, as in (14)-(16), and it does not need any other adverbial modifier. That means when a stative verb, such as *xìhuan*, is used to compare subjects, the comparison can be made in the degree of intensity of the verb phrase, as in (17).

(14) laoshi hen xìhuan zhège xúesheng (Meng et al. 1987:801)
teacher very like this student
The teacher likes this student very much.

(15) wòmén dou hen xiang nì (ibid 1987:816)
we all very miss you
We all miss you badly.

(16) nainai hen ài háizimén (Wang 1984:79)
grandma very love children
Grandma loves children very much.

(17) ta bì nì xìhuan Zhangsan (Li & Thompson 1981:565)
3sg COMP you like Zhangsan
S/He likes Zhangsan more than you do.

Unlike stative verbs, *niàn* 'read', a dynamic verb (Quirk et al. 1985), cannot be modified directly by *hen* in a preverbal position in a noncomparative sentence, as in (18). Instead, *hen* must be used together with another adverbial modifier, such as an adverb of manner, as in (19). Consequently, when a dynamic verb is used to compare subjects, the comparison is made along the manner signified by the adverb of the verb phrase, as in (20), and they cannot be compared in the degree of intensity of the verb phrase, as shown in (21).

(18) *Xìnmei hen niàn bàozhi
Xinmei very read newspaper

(19) Xìnmei niàn bàozhi hen kuài
Xinmei read newspaper very fast
Xinmei reads newspaper very fast.

(20) bàozhi, Xìnmei bì wò niàn de kuài
newspaper Xinmei COMP I read CSC fast
The newspaper, Xinmei reads faster than I do.
(Li & Thompson 1981:568)

(21) *Xìnmei bì wò niàn bàozhi
Xinmei COMP I read newspaper

Although (17) and (21) share the same syntactic structure, only the former is grammatical and acceptable. It shows that the verb phrase characterizes the standard of comparison differently depending on the type of verb. In the case of a stative verb, it can be the degree of intensity of the verb phrase that expresses the standard of comparison. Whereas in the case of a dynamic verb, it is the adverb of the verb phrase that characterizes the standard of comparison.

Thus, when *xìhuan* 'like', a stative verb, is used to compare direct objects, no matter where the direct object is placed, the sentence cannot fit the formula, as illustrated in (12). Accordingly, Li and Thompson (ibid:570) argue that when direct objects are compared, the idea must be stated in such a way that it conforms to the conditions of the formula by comparing 'my liking of dogs' to 'my liking of cats' along the dimension *duo* 'much' with a complex stative construction as in (22):

(22) *wò xìhuan gòu* bì *wò xìhuan mao* xìhuan de duo
I like dog COMP I like cat like CSC much
I like dogs better than cats.

The structure of the complex stative construction is as follows (ibid:623):

clause *de* stative clause/verb phrase

Li and Thompson (ibid:628) also point out that 'one of the most striking structural properties of the complex stative construction manifests itself when the verb in the first clause is a transitive one with a direct object'. In this case, 'the verb (in the first clause) must be "copied" before the *CSC de*' (ibd:628). For example, the verb *shuo* 'speak' in (23) is copied before *de* (ibid: 628):

(23) ta *shuo* Tàigúo-hùa *shuo* de *feicháng líulì*
3sg speak Thailand-speech speak *CSC* extremely fluent
S/He speaks Thai very fluently.

Accordingly, when the complex stative construction is used for the comparison of direct objects, as shown in (22), not only the verb *xìhuan* 'like' needs to be copied before *de*, but it also occurs in both *X* and *Y* of the formula. In addition, the same subject occurs in both *X* and *Y*, so that the requirement for *X* and *Y* of the formula can be met. With the use of *duo* 'much' in the dimension, all the requirements for the formula are satisfied, and the direct objects can finally be compared. However, Li and Thompson's argument (ibid:570) for the use of complex stative construction to compare direct objects cannot explain the following sentences which are grammatical without the complex stative construction.

(24) tamén yánjiu dòngwù bì zhíwù xìxin
3pl study animal COMP plant careful
They study animals more carefully than plants.

(25) ta zhàogù bíerén bì zìjì zhoudào
3sg look after others COMP him/herself thoughtful
S/He looks after others better than him/herself.

(26) ta niàn yingyu bì hànyu kuài
3sg read English COMP Chinese fast
S/He reads English faster than Chinese.

Although some elements are omitted in the above sentences, as shown in the parentheses in (27), a variant of (26), the repetition of these elements is optional here. However, the repetition in Li and Thompson's example, as in (22), is obligatory. Without it, the sentence becomes ungrammatical, as in (28).

(27) ta niàn yingyu bì (ta niàn) hànyu (niàn de) kuài
3sg read English COMP 3sg read Chinese read CSC fast
S/He reads English faster than Chinese.

(28) *wò xìhuan gòu bì mao duo
I like dog COMP cat much
(I like dogs better than cats.)

In addition, Li and Thompson's argument (ibid:570) cannot be employed to a situation when different verbs are involved in the comparison of direct objects as in (29). In this case, the repetition of the verb simply cannot be made.

(29) ta shuo zhongwén bì wò xìe yingwén kuài.
3sg speak Chinese COMP I write English fast
S/He speaks Chinese faster than I write English.

We can see that the verbs are all dynamic verbs in the above examples in which the complex stative construction is not used in the comparison of direct objects. It shows that similar to the comparison of subjects, when dynamic verbs are used to compare direct objects, the standard of comparison is specified by the adverbs of the verb phrases. Thus, contrary to Li and Thompson's argument (ibid: 570) that a complex stative construction must be used when direct objects are compared in Mandarin Chinese, it is not obligatory in this environment because the sentence structure can fit their formula.

Nevertheless, it does not mean that it is obligatory to use a complex stative construction when stative verbs are involved in the comparison of direct objects. Just as native speakers of any language who have the ability to use different syntactic structures to convey the same meaning, the Chinese also have other options when stative verbs are involved in the comparison of direct objects, as in (30) and (31). They may also use different sentence structures for rhetorical functions as in (32) and (33):

(30) wò ài gaoshan, gèng ài dàhai (Wang 1984:64)
I love mountain still more love sea
I love the sea more than the mountains.

(31) ta ài chang shèngguò ài jia
3sg love factory better than love family
S/He loves her/his factory more than her/his family.

(32) xiangbì zhixià, ta gèng hèn Xufu (DNC 29)
compare below 3sg still more hate Xufu
In comparison, he hates Xufu even more.

(33) wò xìhuan xiàshou jijié, xìhuan xiàshou shí de tiánye,
I like harvest season like harvest time NOM field

gèng xìhuan kànjiàn shouhuò-le de nóngmín (Jia 1996:23)
still more like see harvest-PFV NOM farmer

I like the harvest season; I like the fields during the harvest; and I like to see the farmers after the harvest even more.

It is obvious that not only do (30), (31), (32), and (33) not follow Li and Thompson's formula (1981:564), but they also contain other comparison words *gèng* 'still more' and *shèngguò* 'better than'. *Gèng* is used frequently in a comparative construction. Both *gèng* and *hen* can modify adjectival verbs in the preverbal position as in (34) and (35), and they both can modify stative verbs in the same position as in (30), (31), (32), and (33). However, neither can modify a dynamic verb in the preverbal position.

(34) chánpìn zhìliàng gèng gao-le (ibid 1984:64)
product quality still more high-PFV
The quality of the products is better.

(35) zhège fangfai hen hao (Huang et al. 1988:347)
this method very good
This method is very good.

On the basis of the above examples and discussion, we may suggest some selectional restrictions for the use of Li and Thompson's formula (1981:564):

(i) It can be used to compare subjects/topics with the same stative verb, either intransitive or transitive:

(36) ta bì nì danxiao (ibid 1981:565)
3sg COMP you timid
S/He is more timid than you are.

(37) ta bì nì xìhuan Zhangsan (ibid)
3sg COMP you like Zhangsan
S/He likes Zhangsan more than you do.

(ii) It can be used to compare subjects/topics with the same dynamic verb, either intransitive or transitive:

(38) Zhangsan pao de bì nì (pao de) kuài (ibid)
Zhangsan run CSC COMP you run CSC fast
Zhangsan runs faster than you do.

(39) bàozhi Xìnmei bì wò niàn de kuài (ibid:568)
newspaper Xinmei COMP I read CSC fast
The newspaper, Xinmei reads faster than I do.

(iii) It can be used to compare direct objects with the same dynamic verb:

(40) tamén yánjiu dòngwù bì zhíwù xìxin
3pl study animal COMP plant careful
They study animals more carefully than plants.

(iv) It can be used to compare direct objects with different dynamic verbs:

(41) ta shuo zhongwén bì wò xie yingwén kuài
3sg speak Chinese COMP I write English fast
S/He speaks Chinese faster than I write English.

(v) It cannot be used to compare direct objects with a stative verb unless the complex stative construction is used:

(42) *wò xìhuan gòu* bì *wò xìhuan mao* xìhuan de duo
I like dog COMP I like cat like CSC much
I like dogs better than cats.

(vi) However, the formula with a complex stative construction is not obligatory to compare direct objects when the verb is stative:

(43) wò ài gaoshan, gèng ài dàhai (Wang 1984:64)
I love mountain still more love sea
I love the sea more than the mountains.

This paper has examined Li and Thompson's formula (1981:564) in the comparative construction of superiority in Mandarin Chinese. Particularly, it has discussed the claim made by Li and Thompson (ibid:569) that direct objects cannot be compared unless the complex stative construction is used. It has shown that direct objects can be compared without the use of the complex stative construction if the verbs involved are dynamic. In addition, it has shown that it is possible to compare direct objects without using the complex stative construction when the verbs are stative. Finally, it has explored the circumstances in which Li and Thompson's formula (ibid:564) can be used and it has offered some selectional restrictions for the use of their formula.

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STANDARDS TO DIFFERENTIATE INDIGENOUS WORDS FROM LOAN WORDS: JAPANESE VS KOREAN

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1. INTRODUCTION. When we consider the diffusion of civilization from the continent into ancient Japan, it is easily understood that the Korean Peninsula played the role of transmitter and Japan that of receiver. Thus, it is no wonder that what are called culture words in Japanese are claimed to be Korean borrowings.

Murayama lists the following seven Japanese culture words to be excluded from proving the affinity between Japanese and Korean, in that, according to his claim, they are probably borrowings from Korean: they are *pata* 'field/farm', *kama* 'kiln, pot', *kasa* 'hat', *kopori* 'county', *kusiro* 'bracelet', *namari* 'lead' and *nata* 'hatchet' (1977:65). It is not, however, explained on what linguistic foundations these words are considered to be Korean borrowings.

In his later work, Murayama lists four loanwords from 6th-century Old Korean and compares them with Middle Korean words and shows how the same accents are observed between them (1988:21). He does not, however, make further comments. And we hesitate to use the accent patterns to test the indigenousness of a word since the recorded data on Old Japanese accent are regarded as matrices of those of the Modern Kansai dialects, which have quite opposite accent patterns to the Kanto dialects.

We should also point out that an opposing opinion exists with regard to indigenousness of those culture words: for example, Martin and Miller reconstruct the same stem **pata-* as the proto Japano-Korean for J *fata* 'field/farm' respectively, though they differ slightly with regard to its suffix, Martin *-xye* and Miller *-xey* (Miller 1971:67).

This paper, thus, aims to establish some criteria for making a judgment on the questionable words with regard to their indigenousness in a language, especially for such a language as Japanese whose affinity with Korean is not yet proven. For, hopefully these words may clarify some aspects of its characteristics and present additional evidence of its affinity with its neighbour language Korean.

2. TESTING STANDARDS FOR PROVING INDIGENOUSNESS OF VOCABULARY. For the purpose, mentioned above, we would like to introduce three bases of test-

ing whether a given word can be assumed to be native to Japanese. The first test is if we can morphoanalyze the word in question in Japanese. For example, J *ware* is analogous to K *wuli* 'we' semantically as well as morphologically. But, as we can analyze it into J *wa* 'I' and *-re* (suffix), a shift from the plural marker J *-ra*, we may claim that J *ware* 'we' is indigenous to Japanese.

The second test is if we can show the cognates of the word in question from among the presumed indigenous words. For example J *aka* is similar to K *aka* 'baby'. And it is obviously Japanese as we can present its cognates: J *wako/ako* 'my child' and J *agi* '[endearing] second person pronoun'.

The third test is if we can find the dialect forms of the word even in the remotest areas far from the cultural center. In this case the word will most probably be a native word.

For example, J *nata* 'hatchet', although it is registered in Murayama's list mentioned above, is found even in the remotest corners of Northern Japan as well as in the South-Western islands of Sikoku and Kyusyu (Hirayama 1992:911–4). Besides, its cognates J *wono, masakari, yoki* 'axe' and *teuna* 'adze' are found all over Japan (ibid.). In Okinawa Islands, dialect forms of *wono* 'axe' such as *bu:nu, bu:na,* and *wu:nu* are found (ibid.). We consider J *wono* a prefixed word and its final consonant *-r* of Proto Japano-Korean **nar* 'blade' lost, from which J *nata* 'hatchet' as well as Middle Korean (MK) *nat* 'sickle' are derived, in that the prefix *wo-* is found in the following words as well: *wo-no* 'field', *wo-ba* 'aunt', *wo-bune* 'boat', etc. J *teuna* 'adze' is considered a shift from *te-wono* lit. 'hand-axe'.

Another cognate of J *nata* 'hatchet' is J *yoki* 'axe'. In order to show its cognacy, we have to compare it with MK *tochAy* 'axe' as their correspondence is proven by applying Martin's laws (1966) as 8-20 + J suffix *-ki/* K suffix *-chAy.* We can show Modern Korean *tokki,* as well as dialect forms *tokhi,* and *to:ki* (Choy 841–2) and J *yoki* 'axe' must have shifted from its proto form **torki,* if we consider Korean dialect *torchi, toski, toschi* (ibid.). Thus we can claim J *turugi, tati* 'sword' and *tatu* 'to cut' are their cognates. J *nata,* MK *nat* 'sickle', MK *nal* 'blade' and J *nagu* 'to shear/mow' are their /n/~/t/ shift cognates, as the initial consonants /t/~/n/ shift is quite common among/between the two languages (Ishii 1993).

If J *nata* 'hatchet' is a Korean loan word, so must also J *katana* 'sword', which is regarded as 'spirit of Samurai', as we can morphoanalyze it into K *khal* 'sword'-*nal* 'blade', and very similar K *khalnal* 'blade' is found in Kyeng-pwuk dialect. And here too, we observe the affinity between the two languages. No Japanese ever dared to claim that J *katana* 'sword', spirit of *Samurai,* is a culture word and a borrowing from Korean.

Now we will start testing J *fata* 'field/farm', the first word *pata* in Murayama's list, based on the three criteria we have introduced above. The word *fata* and its suffixed form *fatake* are registered in the oldest Japanese anthology *Manyousyu* (edited circa 771). The initial consonant /h/ of these words in the compound form is often voiced as in *komugi-bata[ke]* 'wheat field' and its original sound is considered /p/ as in Murayama's transcription, and thus, much closer to the pronunciation of MK *pat* (field/farm)

3. MORPHOANALYSIS OF J *fata* AND MK *pat* 'FIELD/FARM'. J *fata* 'field/farm' is morphoanalyzed into the prefix *fa-* and the stem *ta*. And the same analysis can be made with MK *pat* 'field/farm', i.e. into the prefix *pa-* and the stem *t*. These analyses may invite a challenge as J *fa-* or K *pa-* is not generally recognized as such. And all the Korean prefixes are supposed to have some clear meanings.

Japanese prefixes on the other hand can be classified into two categories: one with clearly recognizable meanings, and the other with obscure and/or unrecognizable meanings, which we call petrified prefixes. And we assert that Korean also has such prefixes, i.e., prefixes without clear cut meanings.

We will show some Japanese words with petrified prefixes first: *fa-ni* 'soil', *fagane* 'steel', *fa-tago* 'inn', *sa-goromo* 'dress', *sa-yuri* 'lily', *sa-giri* 'mist', etc. It is not possible for us to find out exact meanings for these prefixes *fa-* and *sa-*.

Some Middle Korean words have what are called initial double-consonants, e.g., *psAl* 'rice', *ptAl* 'daughter', *ptulh* 'garden', *stAh* 'earth', *stulh* (garden), etc. We assert that the initial letters of these words should be considered as petrified prefixes, and they may have been pronounced with a vowel as we see in Modern Korean *patang* 'place' with petrified prefix *pa-* and the stem *ttang* (earth). And we can easily recognize that MK *patang* 'place' and MK *mat* (id.) are doublets, as the latter's Modern Korean form is *matang* (id.). Both of them are prefixed with *ma-*, corresponding to Japanese petrified prefix *ma-* observable in J *mafani* 'red clay'. We recognize the same stem in MK *mat* 'place' *-t* found in MK *pat* 'field/farm'.

As will be clearly recognized in these examples, petrified Japanese and Korean prefixes correspond to each other, which presents another proof of the affinity between the two languages.

Thus, J *fata* and MK *pat* 'field/farm' have a similar prefix and stem, whose original meaning and form we reconstruct as Proto Japano-Korean **tVr* 'earth'. And our reconstruction will be supported by Manchu and Mongolian *tala* 'field' as well as Turkish *tarla* 'field/farm'.

4. COGNATES OF THE RECONSTRUCTED **tVr* 'EARTH'. We have shown the Proto Japano-Korean **tVr* 'earth' as the etymon for J *fata* and MK *pat* 'field/farm'. We can present its Japanese derivatives, such as *ta* 'rice field', *tiri* 'dust', *tuti* 'soil', *doro* 'dirt', and */t/~/n/* shift words such as *nawi* 'earth-quake', *no* 'field', *ni* 'clay', *nifa* 'garden', *nora* 'field/farm' etc. And we can also present their Korean cognates such as MK *stA/stang* 'earth/soil', *tul* 'field/farm', *ptul/stul* 'garden', *nala* 'country', and *non* 'rice field'. With regard to Japanese, we ex-

pect little controversy by claiming that J *fata* shares the same etymon with cognates shown above. Its corresponding Korean *pat*, however, will raise a question if a single consonant can constitute a stem. For this question, we have shown above another example sharing the same etymon: MK *mat* 'open space' shares the same etymon with MK *matang* (id.).

The stem of J *nawi* 'earth-quake' *na*, has its cognates: J *ni* 'clay', *nu*, *no[-ra/-ru]* (field/farm), etc. J *beni* 'rouge' originally meant 'soil/clay' as J *pani* 'soil/clay', in that some clay was used as paint or rouge among ancient Japanese.

J *tuti* 'earth' is suffixed with *-ti*; which suffix denotes a supernatural deity, as animism was prevalent among the Japanese, e.g., J *woroti* 'snake', *ikaduti* 'thunder', *fayati* 'gale'.

We also assume that J *tu* and MK *nAl* 'ferry/ford' are derivatives of Proto JapanoKorean **tVr* (earth), and the stem *nAlA* of MK place name *Koma-nAlA* is transcribed in Chinese as 'ferry/ford'. And the Japanese place *Narita*, an international airport, may originally have meant the same.

5. DIALECT FORMS OF J *fata* AND K *pat*. We assert that if dialect forms are found in the remotest corners both in the northern and south-western part of Japan, the fact will attest the high probability of the indigenousness of the word in question.

The Japanese dialects HADAKI (sic.) of the most northern part of Japan Main and PATAGI (sic.) of the Yaeyama Islands, the most south-western islands of Japan (Kokuritu Kokugo Kenkyujo 1970) will support our claim.

J *nora* corresponds with MK *tul* 'field/farm' semantically and morphologically as n/t-21c-ll-23, if we establish a supplementary law n/t based on the correspondence between J initial /n/ and K /t/ (Ishii 1993), something missed in Martin's laws.

By examining Japanese and Korean dialects, we notice the remarkable similarity between the two languages, and this similarity can be observed by comparing the dialect forms of J *nora* and K *tul*, which are cognate with J *fata* and K *pat*, as we have discussed above, though the former pair also have the meaning of 'wild field' which the latter pair lack. Examine some Korean dialect forms for *tul*: *tu:lpatak*, *petang*, *peteki*, *petek*, *petelki*, *peteng*, *peteyki*, *ple*, *pel:* (Choy 1990:97–99) and the Japanese dialect forms *tazuru*, *tazuro*, *curu* 'rice field' of eastern Kyusyu (Kokuritu Kokugo Kenkyujo 1970).

For the Korean *tolpath* 'field/farm full of stones', we can find dialect forms *tol:tta* and *tolccakppwuli* (Choy 1990:94), and the former has a morpheme similar to J *ta* 'rice field', and the latter Japanese dialect form *paru/pari* 'field/farm'. We believe, however, that these forms are probably directly derived from the same etymon with MK *hAlk* 'earth', which, the Korean ending -*k* being a noun suffix, corresponds with J *fara* 'field'.

Martin's corresponding laws lack the correspondence between J /h/ and K /h/. And Ramstedt claimed Korean /h/ is derived from original /s/ (Kim 1983:167). We do believe that Korean initial /h/ also shifted from original /k/ and /t/, and that both J *fara* 'field' and MK *hAlk* 'earth' are derived from the Proto Japano-Korean **tVr* (earth). In order to show the corrspondence between J /f/ and K /h/, we present some supporting data: J /f/ = MK *hAy* 'sun' cf J *ka* 'day', *firu* 'noon'; J *fito-* = MK *hAn-* (one/single); J ...*fa*... = MK. ...*hAn*... 'subjective case marker'; J *fito-[daru]* 'vat, lit.? big vessel' = MK *han* 'big'; J *fima* 'free time' MK *him himi* 'leisurely'; J *fiku* = MK *hye-* 'to pull'; J *fyoro-fyoro* = MK *hulhil hA-* 'slender'.

It is difficult to find out if MK *pel* and MK *tul* 'field' are doublets. But we may more easily prove that J *fara* is cognate with MK *pel* 'field' than J *fara* 'field' with MK *hAlk* 'earth', as the former pair are semantically show identical. We assume that J *fara* 'field' derived the meaning of 'field/farm' in the same way J *nora* 'field/farm' did from the meaning of 'wild field'. Thus, we assume J *nora* and *fara* might have been derived from the proto Japano-Korean **tAr* 'earth', from which J *faru* and MK *kal-* 'to cultivate' may also be derived.

And K *ttang* 'earth' has such dialect forms as *nalpatak, ttangpatak, ttangppatak, tangppaktak, ttayngpatak, ttayngppatak, hukppatak* (Choy 1990:99–100). These also attest that J *ta* 'rice field' and the stem of *pata* 'field/farm' are derivatives of the reconstructed Proto Japano-Korean **tVr* 'earth'.

6. CONCLUSION. In this paper, we have established three bases for testing whether a Japanese word in question is indigenous or not. And these tests show that J *fata* indicates little sign of being borrowed from Korean *pat*. The reason for their morphological and semantical similarity will be attributed to the fact that both Japanese and Korean share the same parent language.

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C01

GRAMMAR AS A NECESSARY *AID* IN LANGUAGE TEACHING

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WHILE EVERY PROFESSIONAL LINGUIST may have an informed opinion about the sort of attention to be given to grammar, our varied experiences incline us in different directions. My own point of view has been shaped above all by many years of teaching Greek and Latin, besides Biblical Hebrew and Sanskrit on occasion. All my teachers had shared the pedagogical principle that an introductory course must consist mainly of grammar, though there could be some flexibility in the order of presenting this or that grammatical topic. For an ancient language no radically different pedagogy, such as immersion, seems feasible; I can scarcely imagine anyone putting together a set of lessons that would effectively convey the essentials without recourse to grammatical terms or paradigms.

One extreme method restricts the beginner's practice to actual ancient texts, short ones chosen for simplicity to be understood with just a modicum of grammar. A novice is thus less prone to wrong inferences about the language. But very few textbooks limit themselves so absolutely. For after all, mastering a language—no matter how foreign—involves the ability to produce and the ability to understand valid new specimens of it. The author of a textbook should know his language well enough to make up good, simple exercises.

In this regard, however, I have been greatly disappointed by one textbook after another, including very recent ones. How can that be, after so many centuries when Latin and Greek have been taught in England and in Anglophone countries overseas? There has been plenty of time for gradual improvement, the shortcomings of the early textbook writers being perceived by their successors and remedied. We tend to expect progress in any field where men have put their minds to their business over the generations. But whether or not that expectation is warranted in general, I am afraid it may not apply to the methods of teaching an ancient language.

The textbooks, particularly in their exercises, betray the limitations of traditional methods, with their emphasis upon grammar. The made-up sentences are usually free from errors of morphology and from gross breaches of the rules of syntax; to that extent the authors have indeed mastered the grammatical lessons. But no one that really knows classical Greek can accept a sentence like this one, taken from the book I used with my class last year:

> καὶ τᾱ̀ς θεραπαίνᾱς πέμπουσιν εἰς τὴν χώρᾱν τῇ δεσποίνῃ
> 'They (are) send(ing) the maids also into the country to the(ir) mistress.'[1]

The writer, who teaches at a college in Minnesota, must have learned a lot of Greek grammar and doubtless has a *reading* knowledge of the language, but cannot be trusted to *compose* even a short sentence in it.[2] For that you need to have not only read but absorbed the literary classics, with their phrasing as well as their vocabulary, and an awareness of the differences between dialects and between prose and poetry.

In every generation we have had at least a few scholars that meet a fairly high standard. Although the writing of new sermons or longer works in this ancient language ceased after the Turkish conquest of Greece and has not been successfully revived, the modern editors of ancient texts are quite capable of judging the merits or defects of variants in the Byzantine manuscripts. Where a manuscript has suffered physical damage, they know how to fill in the gaps, not always restoring the original author's lost words but at any rate coming up with something compatible.

Such experts have seldom taught beginners—not to mention writing up a textbook for them. The indispensable task of elementary instruction devolves, for the most part, upon those who do not rise to a higher level of philological or literary study. What they know well is grammar, as a set of rules and paradigms.

One rather recent change that makes it harder to gain a true mastery of Greek—a sort of *Sprachgefühl*—is the decline of oral reading. The more you are encouraged to read English silently, the less effort you will put into pronouncing the Greek words with their difficult, uncongenial phonology, full of oddities in the diphthongs, besides the distinction between aspirate and non-aspirate consonants and the complex accentuation. Instead you will rely on visual copying, which is ill suited to implant the language in anyone's memory. Even a defective pronunciation of Greek is better than a voiceless impression of the words on paper.

The textbook writers do a little better with Latin than with Greek; and one reason, I believe, is that the phonology of Latin strikes us as less aberrant. We take to Latin words without so much trouble or concentrated study. They impress us as more or less familiar because the general English vocabulary is replete with borrowings from Latin—however much altered in their adjustment to English phonology. When we encounter the Latin noun *nātūra*, not only do we recognise it instantly; we can even appreciate the transparent rationality of its structure, divested as it is of the spelling conventions of English that rather disguise than reveal the pronunciation of the derivative word *nature.* The borrowings from Greek are much fewer, except in specialized, technical fields.

Colleagues and friends of mine have maintained that no significant harm comes from the sentences that I complain of, such as καὶ τᾰ̀ς θεραπαίνᾱς πέμπουσιν εἰς τὴν χώρᾱν τῇ δεσποίνῃ or, in Latin,

> *Parvus numerus Graecōrum ibi remanēre poterit*
> 'A small number of Greeks will be able to remain there.'[3]

For the students approach such sentences like a problem in algebra; they do not absorb or internalize them as models of the language, but only use them as illustrations of certain grammatical rules. Presently they go on to apply the rules to real texts in Greek or Latin, where of course they will encounter nothing to reinforce in their minds the unidiomatic or absurd features of the textbook exercises. As long as their main goal is to read the masterpieces of classical literature, any method that succeeds in teaching the essentials of grammar achieves its purpose. Whatever has not been covered, because it seems not to fall under a formulated rule of grammar, needs to be filled in little by little as the advanced student copes with the difficulties of the ancient texts. As for making more active use of the language for new compositions, that ranks as a hobby, limited to a few persons of scholarly temperament.[4]

I am ready to acknowledge considerable merit in this defense of the textbooks. Nevertheless I worry that their deficiencies may cause more damage in our time than formerly. It is still possible for an individual, if not a whole class of students, to surmount the misunderstandings that the textbooks invite; but fewer and fewer individuals are advancing to that level. The beginners' study time could be better spent if in each lesson they were given decent—or at least passable—exercises for practicing the new grammatical information.

A language that has been perpetuated in school, long after losing its vernacular base, depends upon a continual renewal of the motives to study and master it. When classical Greek was re-established in the schools of Italy in the fourteenth century, and thereafter in other Western countries, the humanists who promoted it believed—and convinced others—that Greek literature was not only more ancient than Latin but richer intellectually and esthetically. That has remained the principal motive for learning Greek. Those humanists seldom tried their hand at composing in the language that they most admired.[5] But if you want to explore for yourself the literary classics and other texts, whether or not translations of them exist, the quality of your elementary lessons makes some difference. Exercises are necessary; but poor ones—unvaried, repetitive, silly—can sap a student's interest in a difficult subject that demands steady, lasting concentration.

Over the centuries the teachers have done their best to transmit the grammar, as it was elaborated in treatises from early in the Christian era or even before then. Like Euclid's geometry, Greek grammar or Latin grammar has not been essentially revised but only rearranged to some extent and translated into modern languages. The present textbooks attempt, more or less, to elucidate the difficulties, wherein English seems especially at odds with the ancient language; but they overlook some analogies that would really help.

For example, the 'middle' voice of Greek verbs, so called because the ancient grammarians were able to define it only as something in between the active and the passive. But a recent development of the auxiliary verb *get* in English will serve to explain the Greek distinction:

a woman says:
    γαμοῦμαι αὐτῶι 'I'm getting married to him' ('middle' with the dative case)
whereas a man uses the active form:
    γαμῶ αὐτήν 'I'm marrying her' (with the accusative).

The 'middle' form is used in: νίζου τὰς χεῖϱας 'Get your hands washed',
as well as in: ϰείϱου τὰς τϱίχας 'Get your hair cut'.

In both languages it does not matter that one of these things you do yourself but someone else does the other for you; from a syntactical point of view they are equivalent. English, however, has also the alternative *Wash your hands*; but in Greek the active νίζε τὰς χεῖϱας means 'Wash the hands [of someone else]'.

The aim of the ancient grammarians, insofar as their influence might reach, was not to make their language more accessible to foreigners, but to replace the substandard Greek, as spoken by all but the literary élite of the Hellenistic world, with perfect Attic. The details of grammar were to pinpoint each correct form, and to explain how to use it—thus ruling out any solecism which the student might have been accustomed to before,[6] or anything incompatible with the standard.

But the same grammar was taught later on, while the home language of the students diverged from it more and more. Even when boys of quite different nationality in other countries were expected to learn the classical language in school, they got the same grammar plus glosses to help them with the vocabulary. *Contrastive* grammar, defining the profound differences as well as the similarities between the pupils' own language and the one they are studying, developed very slowly and has yet to be worked out in sufficient detail.

Many teachers are rightly dissatisfied with the textbooks that they have to choose from, and some of them not only try out their own lessons but arrange to have them published. I am sorry to say that the ones I have examined are no great improvement; the authors do not appear to know the ancient language well enough. But there is hope that adequate textbooks will yet be produced, not too many years from now.[7]

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[1] The dative construction is misconceived, as though appropriate in view of the English preposition *to*. Genuine Greek calls for παρὰ τὴν δέσποιναν (or possibly πρὸς τὴν δέσποιναν or ὡς τὴν δέσποιναν, depending upon subtle differences in the context).

[2] Recently she received a national award for excellence in teaching from the American Philological Association, which cites many accomplishments besides her textbook.

[3] *Pauci Graeci* is more idiomatic, with the gloss 'few Greeks'—the fine distinction between *few* and *a few* being blurred in Latin.

[4] *The Classical World* (published by the Classical Association of the Atlantic States) often prints OVATIONES in Latin written by a university professor in honor of a colleague. One of them recently began, 'Nunc nobis feliciter facultas suppetit ut quandam mulierem [!] praeclaram, quae tantos [!] annos de hac societate optime meruerit, commemoremus'. Another professor produced this howler: 'Aliqui dicunt historiam magistrum [!] vitae esse'.

[5] In that regard, Milton's rendering of certain Psalms in classical Greek meter is worth mentioning, if only as a curiosity. Like other humanists he learned Latin first, knew it more thoroughly, and composed a great deal in it. Out of the huge neo-Latin literature a few works became classics of permanent value: More's *Vtopia*, Spinoza's *Tractatus theologo-politicus* and *Ethica ordine geometrico demonstrata*, Newton's *Philosophiae naturalis principia mathematica*, Linnaeus' *Systema naturae*. (The Greek terms in the titles testify to the powerful influence of the ancient classics upon the authors.) But since the seventeenth century composition in Latin has waned gradually, even among classical scholars. Only in the field of epigraphy do the two major and unfinished series, *Corpus inscriptionum Latinarum* and *Inscriptiones Graecae*, still use Latin to the exclusion of any modern language. But when *Supplementum epigraphicum Graecum* was revived by scholars in the Netherlands after an interruption during the Second World War, only the Latin title was retained; the commentary is entirely in English.

[6] The term σολοικισμός was derived from Σόλοι, a city in southern Asia Minor on the edge of the Greek world before the conquests of Alexander, and was extended to various imperfections in the speech and even the writing of millions who did not receive a proper education.

[7] If I were challenged—not unfairly—to go beyond criticizing and produce a better textbook myself, this would be my reply: Apart from teaching, my time has been devoted mainly to research in historical linguistics, rather than language pedagogy. I did, however, compose my own *Hebrew Grammar: An objective introduction to the Biblical language* (Binghamton, 1966), because the existing ones were even worse than what I used for Greek and Latin; they distorted the phonology of Hebrew so badly that the morphology too came out virtually incomprehensible.

ICONICITY AND THE *RE*-PRESENTATION OF INFORMATION IN DISCOURSE

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The old saw holds that a picture is worth a thousand words. When we think about it, we detect a certain ambiguity in the *cliche*. Normally, we interpret it to mean that a picture can communicate as effectively as 1,000 words. But *worth* also contains the notion of 'cost' within its meaning. Even with today's technology, pictures cost—in terms of publication costs, page count, electronic transmission time, bandwidth consumed, computer memory required, etc.—more than text. Below, I shall argue that in the normal sense of the *cliche* it is not the value of a picture but rather the value of other sorts of visual images that are worth a thousand words—increasingly so in current discourse and most of all in published scientific papers. At the same time, I shall use the second sense of *worth a thousand words*, 'cost', to try to document the increasing importance of visual images in scientific papers.

A recent article in *The chronicle of higher education* notes that 'images have become a predominant means of transmitting information in the 20th century and may be even more so in the 21st' (Heller 1996:A8). Scholars in the humanities studying visual imagery include 'researchers in art history, film and media studies, anthropology, cultural history, and literary studies as well as philosophers and intellectual historians' (ibid.).

One could argue, and I shall, that the central means of representing information in discourse has been changing before our very eyes, so to speak, that this phenomenon has been going on for the longest time in the sciences, particularly the harder sciences, and that most of us remain largely unaware of it. Up to now, the list of scholars studying such phenomena seems to have been drawn from the humanities and the softer social sciences, fields characterized by informal posing of research questions, opportunistic sampling, biased selection of data, impressionistic 'testing' of hypotheses, discursive rhetoric, and a premium on advocacy in treating contributions to the growth of knowledge. In addition, these fields appear to have been increasingly inhabited by practitioners of postmodern Theory, with a capital T, whose fruits may be discerned in the continuing flap over recent contributions to the journal *Social text*.

Absent from the study of visuals (Hacker 1995:52) has been that subdiscipline of the science of linguistics devoted to the study of how meaning is represented in conversations and texts, the study of discourse. Absent as well as far as I can tell has been any attempt to infuse scientific rigor into the study of visuals in the transmission of information.

Here, I propose to make a start in remedying these absences. In doing so, I shall adopt discourse based upon fundamental economic principles. I shall assume that there are costs involved in thinking and conceptualizing research problems—the human brain is, after all, finite—in formulating discourse, and in publishing or transmitting information. Specifically, I shall assume that incorporating visuals into discourse costs more than expressing the same meaning, if it can be expressed or even formulated, in language. Matters of word count or page count (See, for example, LACUS' own policies regarding the length of papers published in the Forum and the concrete cost of exceeding limits.), file size, transmission time, bandwidth required, and so forth impinge directly upon the structure of discourse. To be even more specific, visuals in a scientific paper take up considerable space. Journal (or other) space (or time, for that matter) is not free. Visuals cost. Even today, they no doubt cost more than text. Presumably, writers, editors, list moderators, et al., would not incorporate visuals into scientific papers unless they returned a discourse value in excess of their cost vis-a-vis text.

In framing the question, 'Is a visual image really worth, in both the above senses, a thousand words', it might be helpful to begin with Lord Kelvin's dictum:

> When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind: it may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of *science* (Bartlett 1992:504).

In reading scientific journals and attending to papers at scientific conferences, I, no doubt like many others, have gotten the impression that the amount of visuals in scientific papers has been increasing of late. Upon reflection, I have gotten the further impression that the type of visuals has been changing rapidly in recent years. Thinking about such matters while reading in scientific journals has drawn me to the conclusion that the very structure of scientific discourse has been altered by the increase in visuals. But impressions are not objective data, and conclusions need to be supported by hard evidence. So I undertook the survey reported herein.

The method is a survey. Conceptually, it is not unlike other survey research—in public opinion polling, land use patterns, 'survey archeology', and large-scale sociolinguistic research. In such research, a sample space (literal or figurative) is chosen, the sample space is divided up into surveyable units, certain of these units are selected according to a rigid process, and every occurrence of the object of study in a given sample space unit is recorded.

For this paper I chose the journals *Science* and *Language*. I surveyed one issue of each journal at ten-year intervals. For *Science* I began with the issue for 19 July 1996, which happened to be the issue closest to the middle of the month when I began the actual survey. Working backward, I then surveyed the issue closest to the middle of the month of July for 1986, 1976, 1966, 1956, 1946, and 1936. Thus, I surveyed 7 issues of *Science* over a period of 60 years. The decision to stop at 1936 was in part arbitrary but in part driven by paper manufacturing technology. The measurement methods I was using required me to examine hard copies of the journal, and journals printed in 1936 are by now so fragile that pages began to disintegrate in my hands as I read them.

After surveying *Science*, I began the study of *Language*. I chose the June number of *Language* since it was closest to the July issues of *Science*, which I had already surveyed. In two years the June issues of *Language* were not suitable for reasons to be discussed below, and I substituted the September issues for those years.

From a given issue I chose only written scientific papers in a narrow sense. For example, the issue of *Science* for 19 July 1996 contains 112 pages, plus the inside of the front cover and both the inside and outside of the back cover contain advertisements. Between the covers one finds advertisements, classified ads, an editorial, the Table of Contents, the masthead, letters to the editor, book reviews, political and fiscal news affecting scientists, and a great deal more. This pattern, with surprisingly few changes, goes back over the 6 decades surveyed. Because I was interested in visuals in the scientific paper, I surveyed only the papers printed in 'Articles' and in the section containing shorter papers, 'Reports'. For 1996, the volume surveyed contained 48 pages. In contrast, *Science* for 20 July 1956 contained a total of 48 pages of which 22 pages were devoted to 'Articles' and 'Reports'.

For the actual survey, I measured column inches of text, exclusive of footnotes, bibliography, etc., for each paper. I then measured column inches of text filled by visuals in each paper. By *visuals* I mean any non-prose material set off by white space and inserted in the paper. This included tables, maps, photographs, micrographs, graphs, schematic diagrams, equations, formulae, rules, and so on. Excluded were complete prose sentences, in any language, whether set off from the main text or not. Included, however, were titles, footnotes, explanations, etc., even in prose, which were clearly a part of a visual. Column inches devoted to visuals were then calculated as a percentage of total

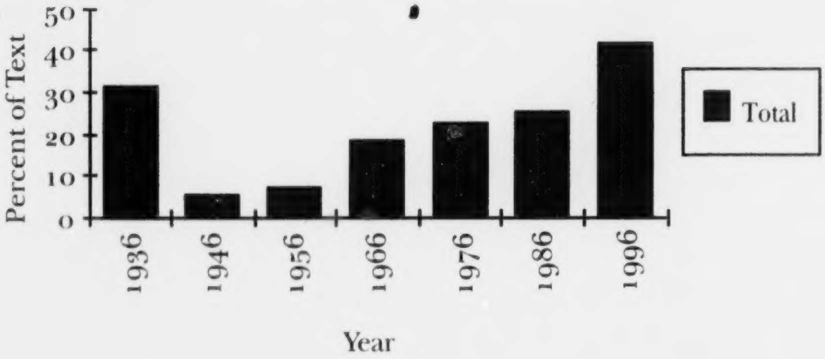

Figure 1. *Science* total non-prose.

column inches. Results for total non-prose (visual) material for *Science* are given in Figure 1.

As we can see, the percentage of text devoted to visuals increased dramatically over the years. In 1946, only 6.4% of papers were devoted to visual material. This rose slightly in 1956, leaped dramatically in 1966, increased steadily through 1986, and then nearly doubled from 1986 to 1996. Clearly, 1936 is an anomaly. When we look at that issue of *Science*, we find that the high value for visuals comes from the inclusion in the section entitled 'Scientific Apparatus and Laboratory Methods' of a drawing of a piece of apparatus and a 'culture jar'. Without the drawings, which illustrate equipment rather than report findings, the percent of text given to visuals is 9.8%, which, though it is higher than any until 1966, is much closer to the figures for 1946 and 1956.

Interesting as the percentages are for the total text area devoted to visuals, they mask a more important trend, one that is more nearly central to this

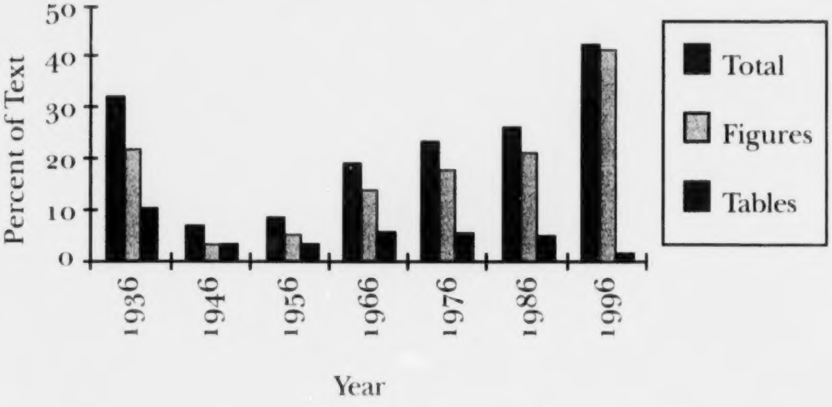

Figure 2. *Science* types of non-prose.

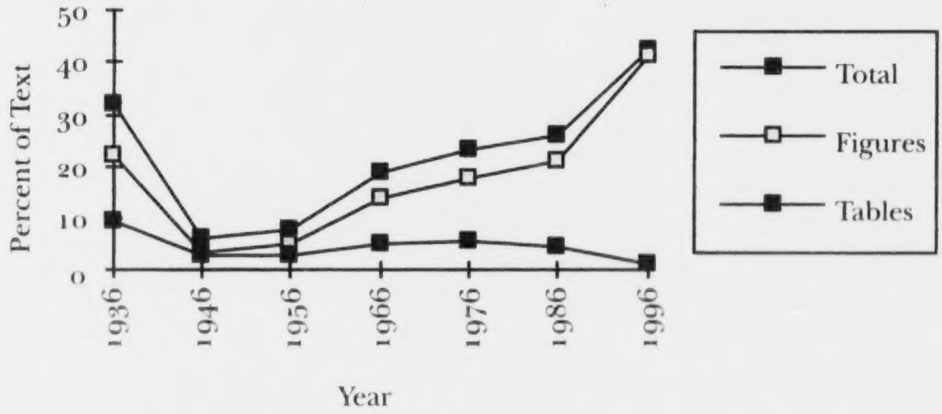

Figure 3. *Science* types of non-prose.

paper, over the decades. Not only does the space allotted to visuals increase, but the kinds of visuals change significantly over the years. Most journals distinguish 'Tables', which normally report data numerically, from 'Figures', which present findings much more graphically. If we distinguish within the total percentage of text devoted to visuals between tables and figures, which I interpret broadly as consisting of all non-prose aspects of a text exclusive of tables: graphs, maps, formulae and equations, drawings, schematics, molecule diagrams, etc., we note the interesting findings in Figure 2.

Clearly, the percent of text in scientific papers wherein information was presented through the use of tables began rather high at 9.8% in 1936, fell to 3% in 1946 and 1956, rose a bit and remained relatively steady around 5% from 1966 through 1986, and then fell rather sharply in 1996.

These trends, along with trends in the use of figures, can be seen even more sharply over the same period in the line graph shown in Figure 3. Here, we not only see that the percentage of text devoted to tables has remained relatively low and decreased in recent years, but also that the proportion of text devoted to figures began to increase sharply after 1956, went up steadily in 1966 through 1986, and then took off in 1996.

Language for 1926 is volume 2 of the *Journal*, given that The Linguistic Society of America had been founded only the year before. Here, it seemed only natural to begin with 1926, a year earlier than the *Science* study had begun. So I surveyed 8 issues of *Language* covering 70 years of the 20th century. For the each issue of *Language* I limited the survey to those papers published in the 'Articles' section of the journal. With two exceptions, I surveyed the June issue for each year. The June number of *Language* for 1946 was dedicated to Professor E.H. Sturtevant, and the issue for June of 1966 was dedicated to Yuen Ren Chao. These special issues differed from the usual June issues in that the special numbers contained a great many more articles many

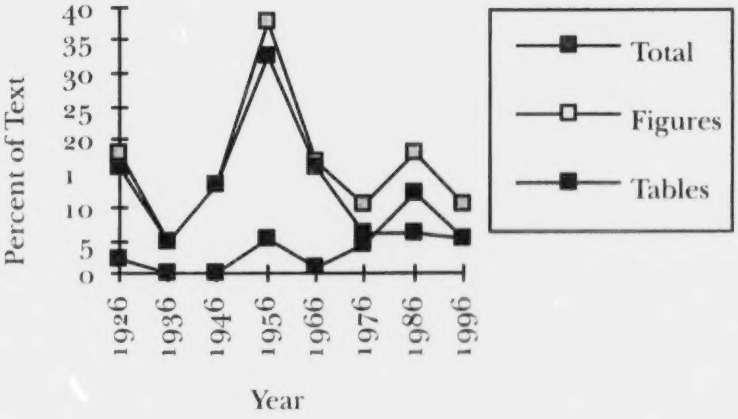

Figure 4. *Language* non-prose.

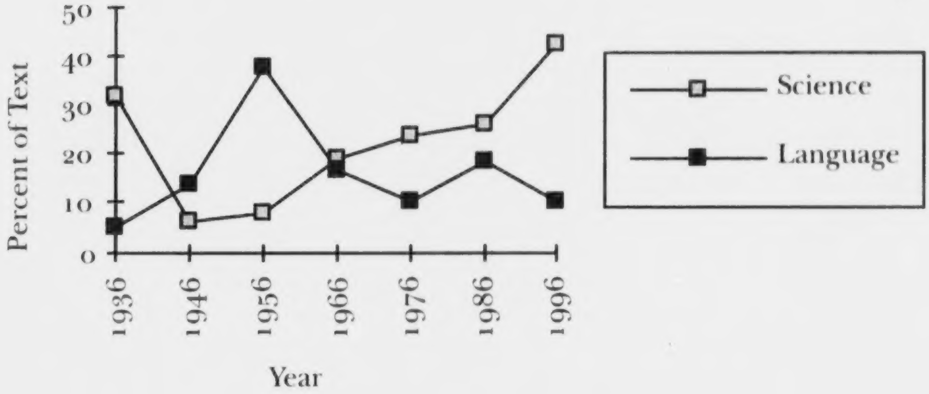

Figure 5. Total non-prose in both journals.

of which appeared to be more in the nature of summing up or taking stock than presenting new findings. For this reason, I substituted the September issues of *Language* for 1946 and 1966 because I felt them to be more representative of the journal's usual content. Nevertheless, one article in the June 1966 issue was startling in its use of visuals, and we shall return to it later in this paper.

As we can see from Figure 4, the pattern in *Language*'s use of visuals over the decades differed considerably from that of *Science*. In *Science* the overall proportion of visuals rises steadily over the past half-century, with two sharp accelerations from 1956 and 1966 and from 1986 to 1996. This sharp increase in the use of visuals in *Science* was due to the steep rise in the use of non-tabular visuals, i.e., figures. In *Language* the use of visuals exhibited a sawtooth pattern, with high points in 1926, 1946, 1966, and 1986, and low points in 1936, 1976, and 1996. The only departure from this patterns occurred in 1956, when there was a spike in the use of visuals, reaching 37.7 percent of text overall. We can compare rates of change in overall use of visuals in the two journals by examining Figure 5.

More important, the sharp rise in the use of visuals in *Science* was driven by an increasing rate of use of figures. Tables remained relatively steady until

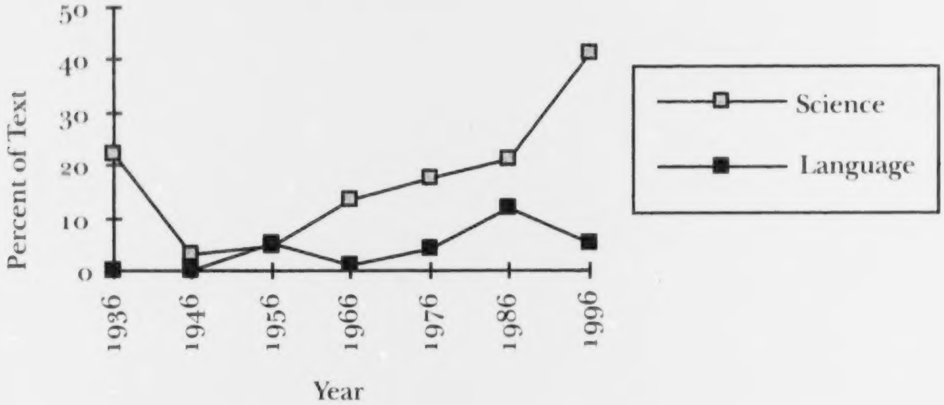

Figure 6. Use of figures in both journals.

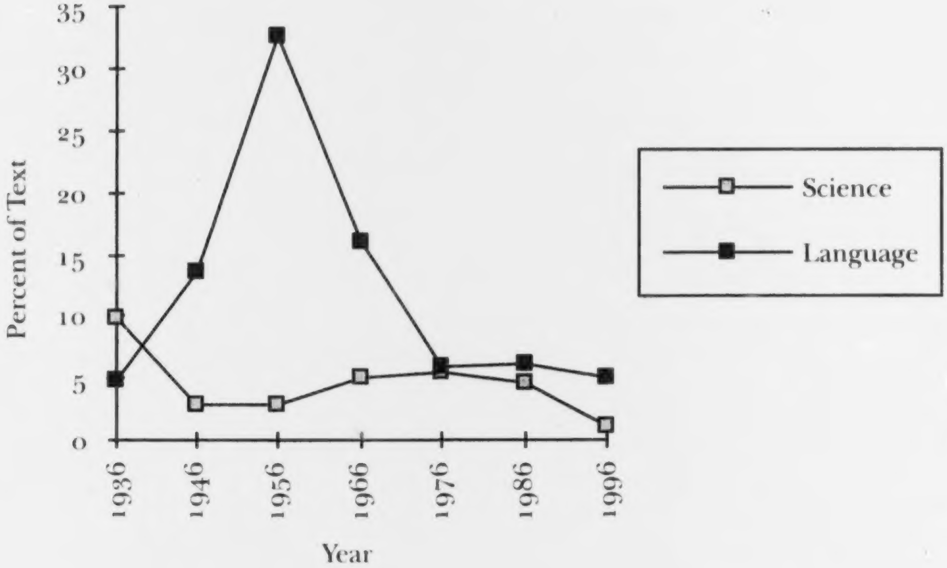

Figure 7. Tables in both journals

1996, when they dropped severely as a percentage of total text in *Science*. In *Language* this pattern was not repeated. Instead, the use of figures in Language remained relatively constant—at a very low level except for 1986, while the use of tables fluctuated over the decades and constituted the main component of the varying percentage of text devoted to visuals.

Figure 6 shows the relative proportions of the use of Figures in the two journals, and Figure 7 shows the differing patterns in the proportion of tables in the two publications.

> [NP the mouse [PP with [NP the [AP short] tail]]]] [VP ran [PP up [NP the clock]]]

Figure 8. A laballed bracketing in place of a tree diagram.

The problem was compounded by the fact that *Language* did not usually label such discourse elements, and the use of the terms table and figure by *Language* was not always consistent.

Three approaches to this problem seemed reasonable. I could have rigidly counted as a visual everything, labelled or not, that was set off from the main text by white space. Or I could have, equally rigidly, counted only visuals that had been labelled either 'Table' or 'Figure'. I preferred to exercise a bit more judgment. So I counted example sentences, in whatever languages and including glosses, as part of main text whether they were set off by white space or not. Paradigms, phonemic representations, phoneme charts, distinctive feature charts, and charts of rule applications in generative grammar (derivations) were treated as quasi-tables and counted as tables, as were the 'morpheme structure equations' in Zellig Harris' paper, 'From morpheme to utterance' (Harris 1946). Rules, nearly all from generative syntax and phonology, were treated as formulae, that is, as non-tabular visuals- figures. Tree diagrams were, of course, treated as visuals. Labelled bracketings of the sort given in Figure 8 above are actually linear representations of the same information found in tree diagrams: they are, in short, instructions for constructing a tree diagram mentally. I chose, therefore, to treat labelled bracketings, which seem to be increasing in use among GB and Minimalist linguists, as figures.

We are left now to ask ourselves what all this means for the structure of scientific discourse.

As we can see from Figure 4, the use of visuals in *Language* has varied over the decades but has, on average, remained about the same. Most of the visuals in *Language* have consisted of tables, especially the peak in visuals in 1956. While the percentage of figures used in *Language* has remained comparatively low, there have been changes in the kinds of figures used, particularly in 'mainstream' linguistics. In particular, there has been a shift from the rules of

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generative grammar, which I consider, along with equations, chemical reaction formula, and the formulae of symbolic logic, to be varieties of formulae, to more graphical, more 'visual' figures.

In phonology, we see a shift from rules of the sort used in SPE (Chomsky & Halle 1968:244):

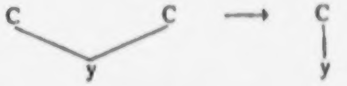
PALATALIZATION

$$\begin{bmatrix} -\text{sonor} \\ +\text{cor} \end{bmatrix} \rightarrow \begin{bmatrix} -\text{ant} \\ +\text{strid} \end{bmatrix} \; / \; \text{---} \begin{bmatrix} -\text{back} \\ -\text{cons} \\ -\text{voc} \end{bmatrix} \begin{bmatrix} -\text{cons} \\ -\text{stress} \end{bmatrix}$$

Figure 9. A rule of generative phonology.

to the much more graphic rules of the sort used in non-linear, i.e., lexical, autosegmental, feature geometric, phonology, as in the degemination rule from Carr (1993:210):

(26) *Degemination*



(where *y* is some feature specification)

Figure 10. A rule of post-SPE phonology.

In syntax, we have seen the complete abandonment since the late 1970s of phrase structure rules like the following ones (Chomsky 1965:107):

(vii) NP → (Det) N (S')

Figure 11. A phrase structure rule in the *Aspects* model.

and their replacement by the X-bar Schema in Figure 12 ,taken from an introductory linguistics text (O'Grady, et al. 1993:166). To show the pace of this change, the X-bar schema does not appear in the first edition of that particular textbook (1988) but shows up in the second (1993) edition.

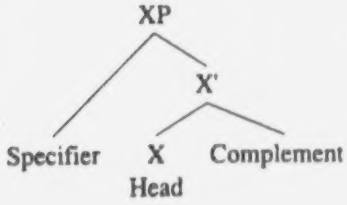


Figure 12. The X-bar phrase structure schema.

Why, then, do we see the rates of use of figures shown in Figures 4 and 6? At least part of the percentages shown in 1986 and 1996 can be explained by the adoption by researchers working in generative syntax of notational devices like that in Figure 8. While such labelled bracketings appear at first glance to be a cross between prose and a sort of formula, they are in reality linear representations of tree diagrams (we could call them 'condensed trees'). Because they are, mostly, linear, such representations take up much less textual space than conventional figures. There is, however, a hidden cost to the use of labelled bracketings: they require the reader to mentally use them to construct a tree in the imagination.

However, the use of labelled bracketings is quite common. In 'Bare phrase structure', Chomsky (1994) devotes 7.5% of his paper to visuals. Aside from a small amount of quasi-tabular representation (.4%), Chomsky has 21 tree diagrams, which constitute approximately 6% of his paper. In addition, though, he uses 36 labelled bracketings, constituting 1.1% of the paper. I estimate that if these 'condensed trees' were expanded, proportionately to the tree diagrams that actually appear in the paper, Chomsky would have approximately 17.4% of his paper in visuals, a figure much more in line with practice in Science about a decade ago (see Figure 6).

But if we wish to see a use of figures in linguistics more comparable to that in *Science*, we have to leave 'mainstream' linguistics and move to the cutting edge. In the June, 1966, issue of *Language*, the number I did not use because it is atypical, the articles are almost 100% prose—except for a paper called 'Prolegomena to a theory of phonology' (Lamb 1966). This paper has 25% of its space devoted to figures, a figure comparable to articles in Science today.

For comparison, I looked at the most recent issues of some journals in the humanities. *PMLA* for May of 1996 contained 2 visuals, both photographs. Neither *Modern fiction studies* nor *Modern language quarterly* had any visuals. So it would appear that the use of visuals, especially figures, is one way of distinguishing discourse in science from that in the humanities. However, *Mind*, a leading journal in philosophy, contained some papers with no visuals, some with proofs and logical formulae, and some with a few figures, facts which probably say more about the discipline of philosophy than about the humanities in general. My university's library does not take the journal *Social text*, so I was not able to obtain data on the softer social sciences, especially those where post-modern Theory, with a capital *T*, is the dominant organizing principle for discourse. It appears, however, that the use of visuals in *Language* is midway between that in the humanities and that in the sciences in general, which may accord with many linguists' conception of the relation between linguistics and the sciences.

There is much more that needs to be studied here, but time and space force me to leave most of the discussion for a later paper. Part of the large proportion of visuals in *Science* can be explained by appealing to the economics of discourse. Articles in *Science* are typically short: a long article will take up 5 pages. And 'Reports' are typically limited to a page or two. And it is in 'Reports' that the use of visuals, especially figures, has grown the fastest in recent years.

Tentatively, I would speculate that what we see in *Science* reflects the latest in a series of changes in the way humans organize discourse. Though we might not want to call the results 'discourse', we can place the first change with the development, probably at the boundary between *Homo habilis* and *Homo erectus*, of what Bickerton (1995) has called 'protolanguage', and which we can define (roughly) as the lexicon. The second change, the one that marks, I believe, the ability to construct true discourse, is the 'catastrophic' development of syntax, the beginning of true language and that evolutionary change that separated *Homo sapiens* from *Homo erectus*, including large-brained subspecies of late *erectus*, like *Neandertal* (Bickerton 1995).

The changes that follow have all been cultural changes, technological changes. First, came the invention of writing. Though it has long been the 'party line' among linguists to insist, rightly, that the spoken language is primary, and, in the case of some linguists that writing is merely transcribed speech, the fact is that the invention of writing changed the structure of discourse and caused important sociolinguistic changes. In speech communities with long traditions of literacy, it appears that the written variety of language has caused changes in all other (spoken) varieties. Notice, though, that writing did not replace spoken language: even scientific papers are read aloud and discussed in spoken language.

Some would no doubt argue that the invention of printing also marked widespread changes in the organization of discourse. I am not so sure. I am sure, however, that the next change, the development of modern mathematics that begun in the 15th century, made scientific discourse possible. It is no accident that modern science and modern mathematics developed together in the same region in the same period. Without the development of the calculus, Newton's greatest work would not have happened. Without the devel-

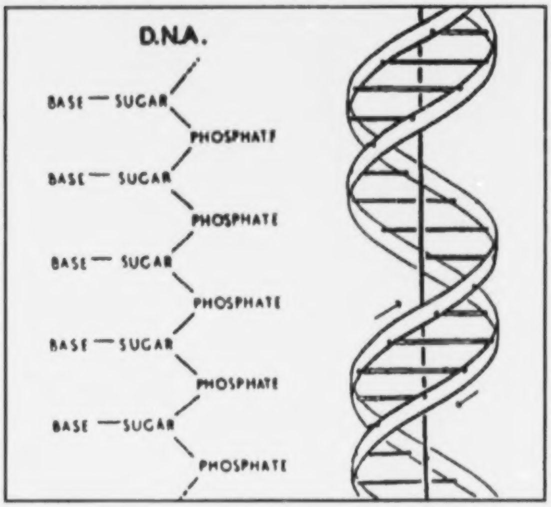


Figure 13. Diagrams from *The Double Helix.*

opment of non-Euclidean geometries in the 19th century and his own development of tensor calculus, Einstein's work on relativity would have been literally unthinkable.

Here, I argue that another change began in scientific discourse in the 20th century. This is not just a change in notation, not just a change in the way in which information is *presented.* It is, instead, a major revolution in the way in which scientific discourse is conceived and organized, a change in the ways in which scientists conceptualize research questions, construct hypotheses, and test hypotheses, a change in the way in which information is *represented.* The elements of scientific discourse that carry the bulk of the meaning have shifted to figures. Science has developed a graphical user interface: we are practicing GUI science.

It is difficult to tell exactly when the change began. Perhaps it began with the Bohr atom. However, the watershed event was probably the publication of a 900-word article in *Nature* (1953) by Watson and Crick in which they formally announced their discovery of the chemical structure of DNA. Not that Watson and Crick invented GUI science: they were merely communicating in the idiom adopted by Pauling and all their other fellow researchers in that area. But the diagrams, some of them highly schematic, of molecules, constituting fully 29% of the article, are crucial to understanding their discovery.

Since 1953, figures like those in Figure 13 have become increasingly more common in scientific discourse. More important, they have become indispensable.

Recently, such figures have gone beyond visual qualities like shape and have begun to use color to carry more information.

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'EDGE OF THE EYE' PHENOMENON

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ABSTRACT. Under the rubric of the so called 'tip of the tongue phenomenon', Western research has (with resulting insight into the nature of memory of linguistic features) explored the commonplace experience of partial forgetting of spoken words. Examining the contrastive Chinese ideographic writing's 'edge of the eye' phenomenon illustrates recall strategies of a visual semiotic system. This paper reports on a study of some 540 Chinese adults attempting some 1,000 recalls of the shapes in characters which are temporarily forgotten in the process of writing. The nature of those attempts to retrieve features of a visual semiotic system, among a population of such a vast scale, provides interesting information into patterns of visual manipulation of these 'linguistic' and perhaps also non-linguistic forms.

APOLOGIA. The process of this research into features of the somewhat analogous 'edge of eye' and 'tip of the tongue' phenomena has led us to find ourselves, as applied linguists, in a somewhat alien world where miscue and misrecall data have no connection with sound, but exclusively with shape instead. Linguists are, reasonably enough, accustomed to the study of a semiotic system utilizing sound as its medium. Hence when research interests include the study of an orthography, we can be mislead into assuming that traditional linguistic-like patterns and frequencies of our cultural experience will be found in that orthographic study. We began the following paper (the first stage in an investigation into a miscue problem among Chinese in the act of writing in their orthographic system) with such traditional linguistic assumptions. We have needed to question these at a very basic level.

INTRODUCTION. The study of cultural knowledge has made considerable progress in the latter half of the twentieth century. Among the strategies by which research in this area has been pursued is the identifying of traces of partial recall of temporarily forgotten linguistic units. While linguists have perhaps been somewhat less involved in such documentation of clues which speakers use in efforts to reconstruct fractionally forgotten lexical items, other disciplines have, by using our domain, explored their own interest, for example the 'tip of tongue' studies.[1]

This study was initiated as a result of noticing a Chinese man who, in the midst of writing, looking up, puzzled, and sketched a character in the air. 'I can almost see, but there is a bit just there I can't see clearly', he said, pointing at a place in his imagined space.

Intrigued by what was being 'seen' and what was missing or distorted, we began increasingly systematically asking Chinese about their experience with forgetting features of characters in their own personal written lexicons of approximately six thousand characters. All the persons we asked stated that they had this problem frequently and often with common words.

We understood the situation with forgetting sound words, but not of these Chinese arbitrary pieces and fragments of shape: the experience of temporarily forgetting a word is a frustratingly familiar experience. We try perhaps to recall the name of 'New Avenue' but cannot seem to get past 'Main'. We know this is wrong but we also sense the error is close to the right word. And we are correct in that impression. Both the words *new* and *main* are in some senses alike. Both are semantically-contextually similar because both are thoroughfare names. Furthermore, the spoken and written forms are short; the written form as well provides a possible shadow of visual recall for the letters of the words are both low in size.

Under the rubric of the study of 'tip of the tongue phenomenon', such a search for exactly what is being remembered and what is being forgotten in such events provides insight into questions of human memory not only of linguistic features. The ubiquitousness in daily life of the linguistic system and, therefore, of examples from among large populations of native speakers provides for relatively easy access to sources of data.

But what of other domains of human knowledge, other informational systems? What is lost in, for example, misrecall of aspects of the visual world? The Chinese writing system provides a unique opportunity for such investigation. The challenges, however, are first in capturing the swiftly moving visual efforts to approximate by individual Chinese in the act of writing and, second, in the nontraditional nature of the linguistic similarities and patterns.

Comparison to recall of individuals' faces, as in a police lineup or in witnesses' accounts of an accident, gives evidence of ways that recalls are like or unlike the actual event. Also, the opportunity of reseeing an object, a person, or place provides data on the extent that recalls match or mismatch the original. But as each object, person, or place being remembered is different, the recall is not of identical phenomena; rather it is esoteric and idiosyncratic.

On the other hand, Chinese characters offer an enormous number of identical public, visual recall events. The complex shape configurations used to write or think of a written Chinese character each time are the same in the minutest of details each time. Hence, the recallings and forgettings allow for comparison across hundreds of thousands of instances and among millions of individuals. Such a visual data source is a unique and mass opportunity for examining a segment of a less well documented semiotic system through study of an orthography. The characters/words are an architectural similarity more precise than the spelled English word, and are more complex visually. They are composed of parts that can be dismantled and looked at like separate items. Their meanings, deriving almost exclusively from the constellation of shapes, rest squarely on the area of the visual semiotic and the knowledge of how to say a word very rarely helps with deciding how it is written.

For example, if we ask a Chinese to write a Westerner's name in character form, typically we will notice hesitation and delay. To the Westerner, as is illustrated in the following, it seems that doing this favor should be a simple task.

When an associate asked a Chinese student to write his nickname 'Drew' in character form, she hesitated and, after some pause, said that she would bring it the next time that they met. The reason was that among the characters which in Chinese speech sounded like 'Drew', the student could pull up in her visual memory characters that meant, among other meanings, 'pig', 'kill', 'cattle pole', 'spider', 'bead', 'dwarf', and 'water on the ground'. Each of these was a different character but the spoken word was Drew-like.

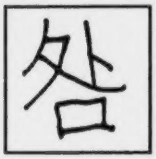
DATA. We speculated that because the literate Chinese in using their orthography were balancing in their visual memory such large numbers (perhaps 6,000 or more) of complex geometric, architecturally arbitrary shapes, here lay a fertile source of a type of visual linguistic recall not as readily studied with other media. The problem was how to get at, while they were occurring, the details of what was being examined by the individual in the act of writing.

Our data was gathered in central China, among some 540 students, college faculty, and college-educated individuals in (a) formal and (b) diverse, naturally occurring, unstructured social situations. The former included closed testing components and open-ended interviews and discussions.

The following reports on our data used six characters which we identified as causing visual, architectural, or spacial problems for Chinese when they attempted to recall them while writing in the moments of edge of the eye forgetting.

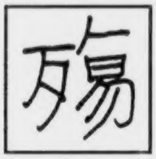
TYPE I DATA: EXAMPLES OF CHINESE ATTEMPTING TO RECALL A PART OR CHARACTER FORGOTTEN. Having, in the course of our exploration, identified especially interesting characters through discussion of Chinese edge-of-eye experiences, we initiated direct questions about six of these.

The following contains the verbalizing of the steps of Chinese writers trying to recall these characters shown at the left. To initiate, we stated: 'We are studying something that happens with all writers that is of interest to us. Please help with this study by saying what you recall of the parts of a character we understand you frequently forget'. In other cases we asked a similar question to people in the act of writing. Some of the following came from these people.

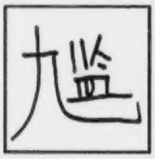


'I know this word's meaning and how to say it, but I don't know exactly how to write it. It's an up and down structural formation, I know. But I'm not sure of both the upper right part and the lower part. The lower part is square-like, I believe, or a square with a horizontal line in it. I'll try it… yes, maybe… Maybe the upper right part needs a vertical line with a small slanting line intersecting it. I'll try that. No, it doesn't look like it. I'll redo and erase the horizontal line in the square. Yes, I think I got it. But I'm still not a hundred percent sure. Does anyone here know for sure or do we need to look it up?'

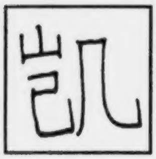
[This person is still wrong.]



'I was writing about the American holiday called Memorial Day, but I did not know how to write the word in Chinese. I know it was composed of three separate designs within the one character rectangle. Each of these parts went into a left, upper right, and lower right position. The left part I know definitely. It is like was a 't' with a tail and a line, I'm sure. The upper right is a simple curve with a line. But what's that under it? It's made of parallel lines 3-4 to the left. Also, there is a small square with the short horizontal line. This is what I remember, but I was stuck for three days so finally I gave up and looked it up in the dictionary'.

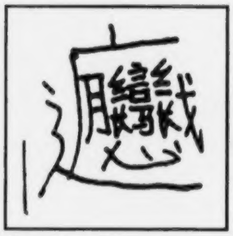


'I often use this word in speaking, yet I often forget how to write it. I know there is a simple unit on the left, the slanting lines has a half square; but I'm unsure about this part. What is there on the right side? There is a cluster of lines, very dense, but the way to put the lines in order, that I cannot recall. No, that combination doesn't look right, the shape is not… Maybe it has two dots or two dots with a roof on the top. Let me look it up in the dictionary'.



'Chinese people report that they forget parts of the shape of words when they stay in another country for even just a few weeks. I had this experience when I was asked to write the Chinese version of an English name, I chose a Chinese meaning that suited the person. The meaning was good and the sound was very like the English name, but when I tried to write it, I kept stumbling over small parts. I knew the general shape, where the units in the character went in the square. I was correct in writing the upper left unit with three vertical lines plus one horizontal line. But I forgot the lower part of the character. I tried several shapes to fit the place, a twist, lines, etc. After some hours of trial, I got it. But not the unit of the one on the right. Then the simple angular shape at the bottom left reminded me that the correct shape on the right was a bit more complex. And so shape reminded me of shape and the puzzle was solved'.

Person #1



'I write a spot on the top... Then I write a horizontal line and then at the left end of the horizontal line I have to write a slanting line with down line... In the left there is... Now let's move to middle inside and inside there are three layers and on the last layer, in the middle, there is this unit and then on both sides there must be 2 twists then second layer under it in the middle there's a horse character and on either side of the horse there is a carriage or I can call it... Then the third layer under it there is a bigger unit... Then a 'heart' unit... And on the left there is something so I'll have to extend this horizontal line and leave a space for that. Next the three layers of units on the left I have to write a big moon character there... There's a three and on the right of the three layers of units, on the upper side nearly on the first layer almost parallel with the first layer I draw a short horizontal line almost wide. The first layer then I write a slanting line from the top to bottom. The hook is up to the right there's a small standing line from left. Is there a spot there on top of this unit? I'm not sure... Yes, there is one...'

Person #2, Same Character

'When you asked me last time to write *biang biang mian*, I couldn't, so I asked my colleague. He had read it in a newspaper, and he showed it to me. I can't remember all, but I remember some parts. I'm sure there are something like two twists on both sides or something, I'm not sure about them. Actually, it's so complex that there is a song that tells which part you need to remember'.

FURTHER EXAMPLES FROM OTHER CHINESE WORKING AT RECALL OF OTHER CHARACTERS OR PARTS OF THOSE CHARACTERS.

i. 'For the character "Geng" soup, I'm still not sure about it. I think there is a unit under the upper part. Now I'm not sure. There is a "rice" unit. Maybe not. I'm definitely sure that this character is an up and down structure'.

ii. 'For this character I can remember that it is composed of two major parts and it is structured in an up and down formation. I can remember two units, but when I write it, one up and one down, it doesn't look correct. But maybe it is'.

iii. 'It is difficult for me because the inside is unusual'.

iv. 'At first, when you asked me about "blame", I couldn't remember anything but how to say it, which is, as you know, totally no help at all in writing it. But I did recall something; here it is. It's just a bit of it. I think it looks like the core of the character, but no one would acknowledge its being a character. Actually I'm brave even to show you this, just two vertical lines with a roof over it'.

v. 'All I can think of is this. It looks like birds flying, doesn't it. I think there is something like this in the character, but I'm not sure. Anyway, that's all I can do of it. That's all that I see. I'll avoid writing that word, but it's okay to say it, of course. But I can't see anything more than maybe birds'.

The above samples (from our corpus of verbalizations of Chinese trying to bring back into focus the geometric/architectual completeness of a character) are particularly interesting in that none of the individuals who provided us with these 'thinkings aloud' examples refer, at any juncture, to sound as a clue stimulus. Always, and in sometimes minute details of speculating spacially, they are trying to pull together lines, areas, positions, angles, or designs.

TYPE II DATA. Following initial informal pilot explorations, we designed more formal studies: We tested 540 students at a rural teachers' college and a capital city university, as well as educated individuals. From these we gathered over one thousand examples of moments of visual forgetting. Students were asked to write for ten minutes on one of four topics. Instructions were to write quickly, not to find an alternative or to stop to mull over any characters which were momentarily forgotten, but rather to leave either a space or a quick approximation. The task's purpose was explained as not evaluation of their literacy, but of a study of forgetting behavior.

The pages were collected. Writers were asked to discuss the recall (which averaged 2 per person) of the words which had 'slipped out of their eye'.

In a second formal test we read out twenty-four Chinese characters and asked that these be written. If the students forgot a character, they were to try to write the items and leave them for later revision.

In a third test, sixteen combinations of Chinese characters were read out (some difficult ones were omitted and some commonly-used ones were added).

Our first approach of interviewing and discussion of the attempts produced by our probes had several disadvantages, one being that the responders were so interested in discovering the corrected character that once the task was completed they immediately began changing views and altering their recall. Therefore, we replaced this step with a form that included three separate trial sheets given to each student before the task was begun. After the pages were collected, the writers were asked to discuss their recalls (which again averaged 2 per person) of the parts forgotten.

The lists in the three pages of data contain selections of the incorrect part from the data collected from these tests. Note how remarkably alike the incorrect versions are to the correct character or character parts. We identified three—perhaps simple but for us extraordinarily interesting—findings: as in the situation with 'tip of the tongue' phenomena where there are similarities among the false and correct recalls, so too the Chinese shape-memory of a form shows close spacial similarity between the correct form and the misremembered form. The misrecall, we found:

(a) was like the correct form in either its complexity or its simplicity of shape; and

(b) looked substantially like the correct version, i.e., the shadow recall retained was remarkably like what was forgotten.

(c) In over 85-90 percent of the times, the location of misremembered parts in the box shape was correct. (This is not evident in the data sheets.)

DATA SUMMARY AND ADDITIONAL COMMENTS. The accompanying charts contain three sets of examples from our data corpus:

Chart 1: Correct characters with misremembered forms;

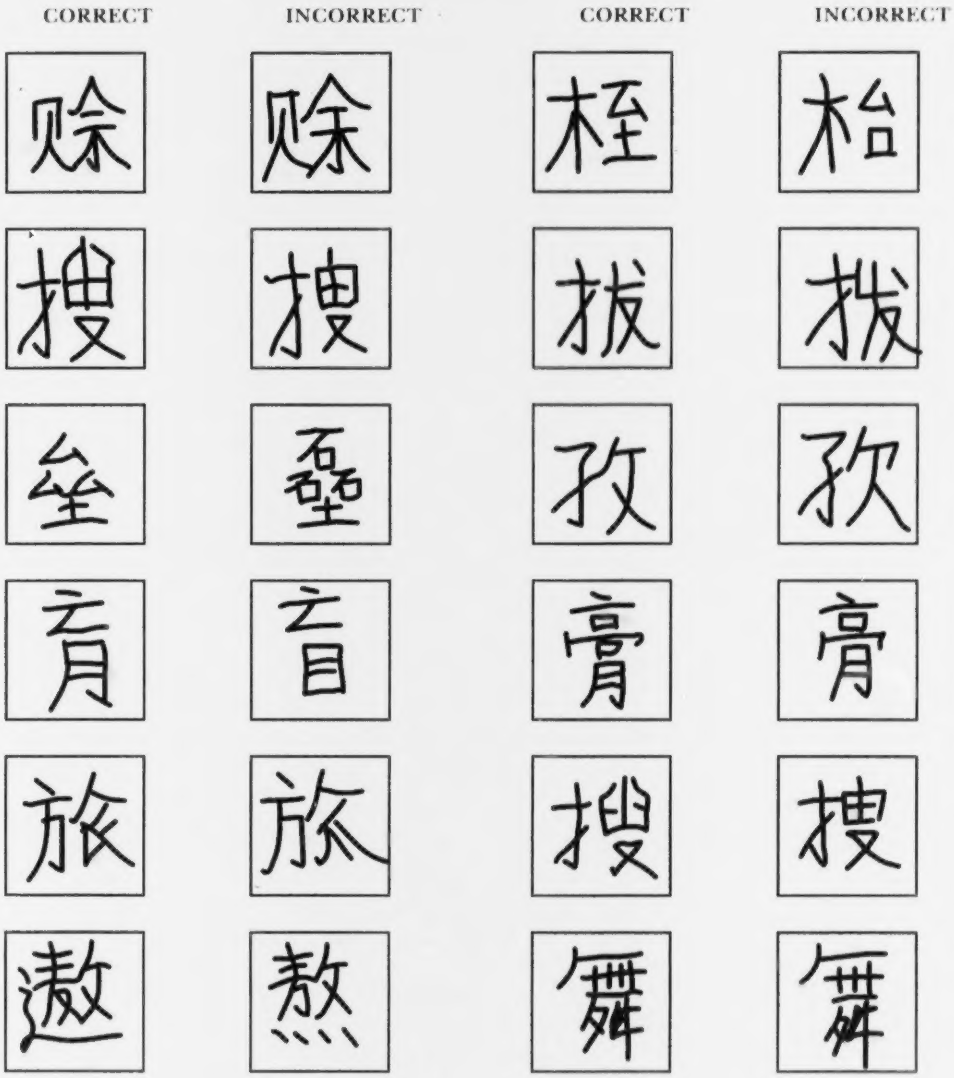

CORRECT
INCORRECT
CORRECT
INCORRECT

Chart 1. Correct characters with misremembered forms.

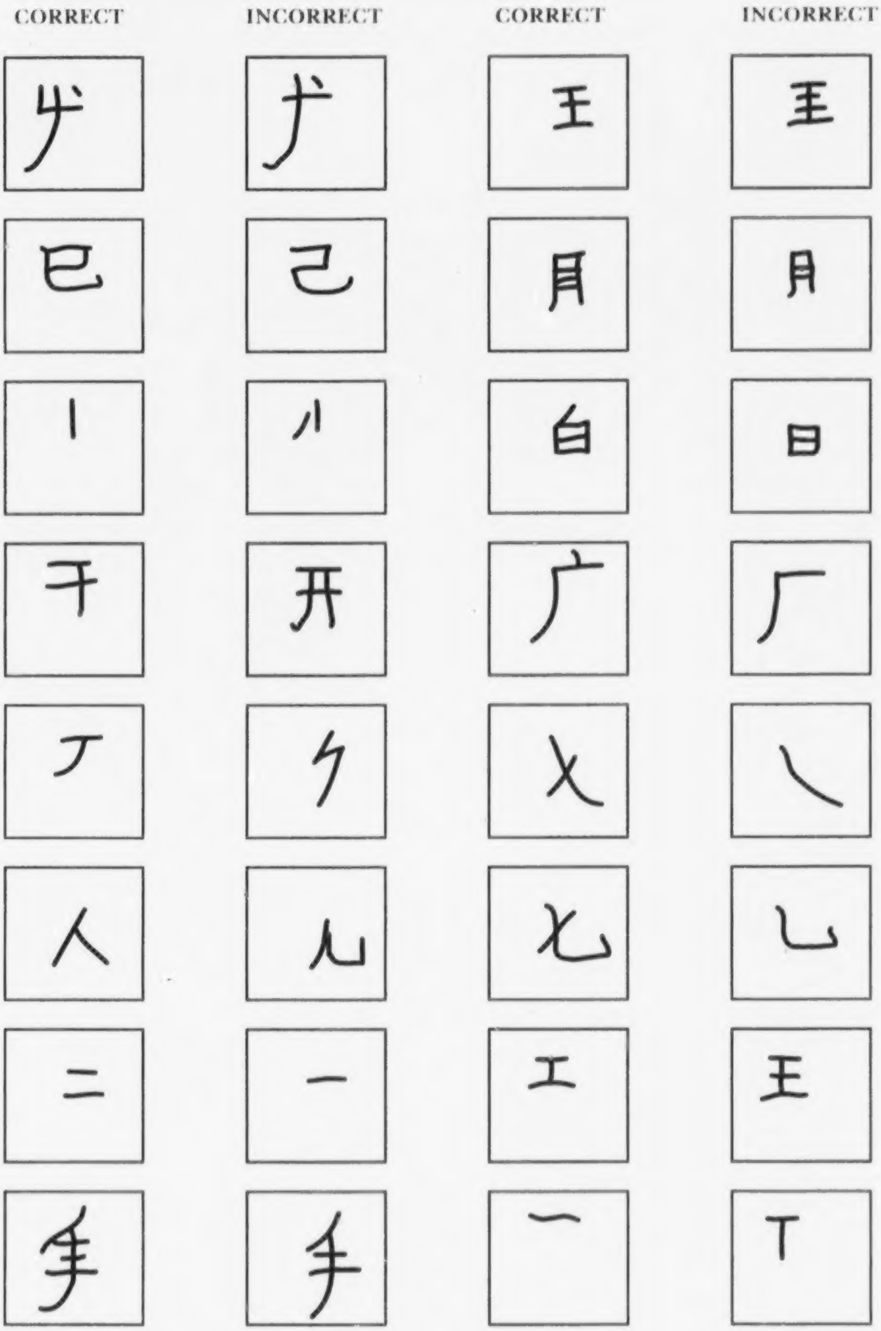

CORRECT
INCORRECT
CORRECT
INCORRECT

Chart 2. Incorrect detail from characters with correct forms.

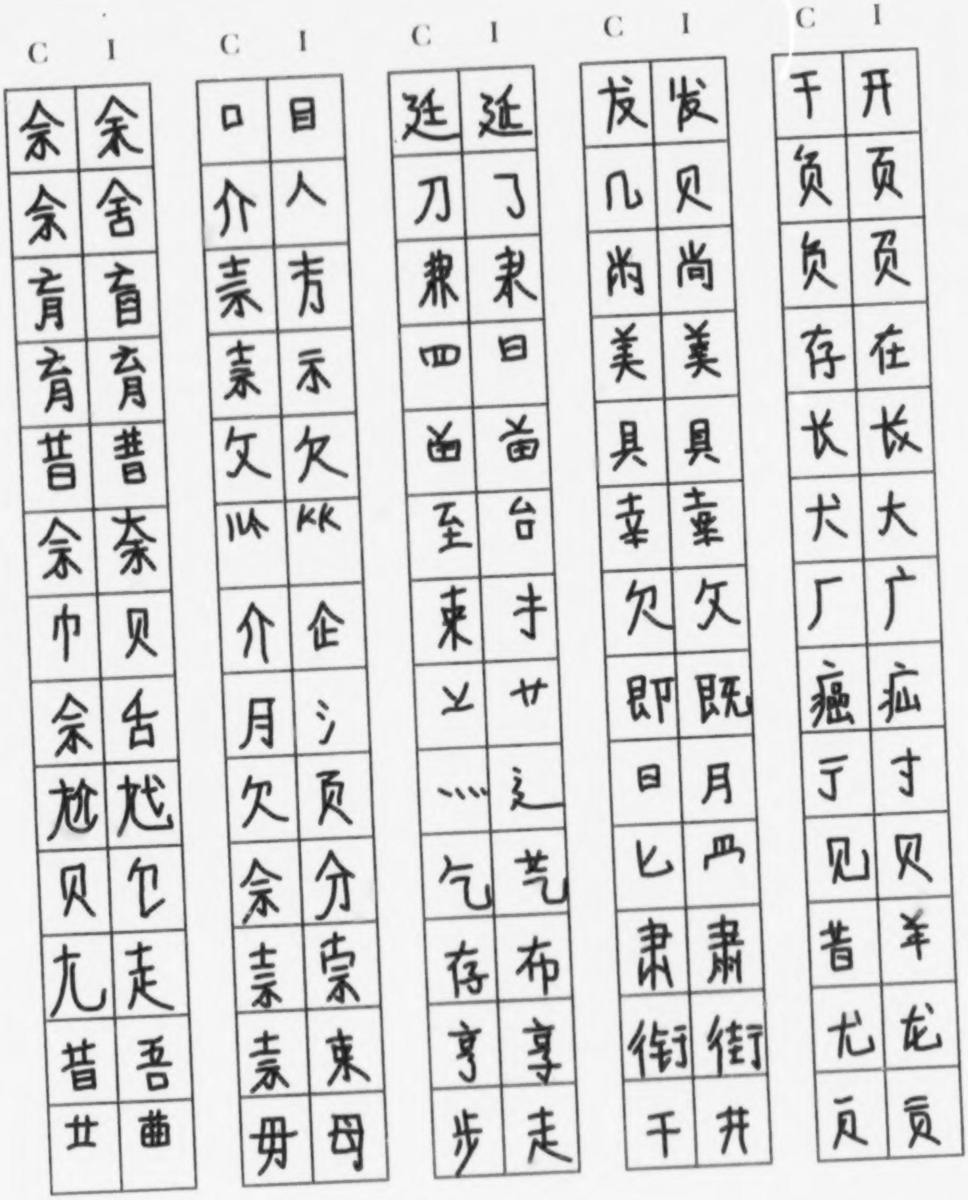

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Chart 3. Correct segments from characters with misremembered forms.

Chart 2: Incorrect detail from chracters with correct forms;
Chart 3: Correct segments from characters with misremembered forms.

Thus, even if they completely forget some part, the writers could still describe the forgotten shapes as being simple or complicated, dense or clear, curved or straight lined, with dots or slantings.

In the vast majority of cases, that part which was forgotten looked like the correct one. In addition, the location was retained. Only 10–15 percent of our data were errors of position. The right side of a character was more frequently recalled than the left, the lower part more frequently forgotten than the upper part, and the inside part more frequently forgotten than the outside.

We do not have the quantity of data that we would need to report on some areas that we feel would be interesting. For example, we would like to know if there are patterns across individuals in the recall or forgetting of vertical lines, parallel lines, intersections, hooks to left, hooks to right.

But of our corpus of 1,000 examples, these types of errors occur in too limited number. A sufficient critical amount of examples did not occur.

CONCLUSION. The misrecalls of Chinese in the midst of daily writing appear on the micro level to be idiosyncratic, but on a broader level they share the general features noted above, which we find fascinating: missing of dots, incorrect hooks to the left or to the right, or short crossing strokes present, absent or misplaced—these seem to be personal types of errors. The Chinese share recall of general format and location as reported above.

Under the rubric of the so called 'tip of the tongue phenomenon', Western research has (with resulting insight into the nature of memory of linguistic features) explored the commonplace experience of partial forgetting of spoken words. Examining the contrasting Chinese ideographic writing's 'edge of the eye' phenomenon illustrates recall strategies of a visual linguistic system. This paper has reported on a study of 450 Chinese adults attempting some 1,000 recalls of the shapes of characters which are temporarily forgotten in the process of writing with a system in which basic shapes directly represent meanings rather than sounds. The nature of those attempts to retrieve features of a visual semiotic system, among a population of such a vast scale, can provide information into patterns of visual manipulation of linguistic and non-linguistic forms, but of such a different nature to the western experience that results cannot be perfectly compared.

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[1] See Burke, Deborah, et al. (1991). 'On the Tip of the Tongue: What Causes Word Finding Failures in Young and Older Adults?' *Journal of Memory and Language.* See also Burke, Deborah, and Laver, Gary. (1989). *Aging and Word Retrieval: Selective Age Deficits in Language.*

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THE PRAGMATICS OF NON-ADVERBIAL *THERE*-CLAUSES IN SCIENTIFIC ARTICLES

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1. INTRODUCTION. Clauses with non-adverbial *there*—also known as existential *there* (Jespersen 1949:107), expletive *there* (Fillmore 1968:82), pronominal *there* (Erdmann 1976:76), anticipatory *there* (Curme 1931:9–10), and preparatory *there* (Jespersen 1933:104)—have been the subject of a great deal of scholarly attention (Bolinger 1977, Rando & Napoli 1978, Sheintuch 1980, Breivik 1981, Ziv 1982, Givón 1983, Quirk et al. 1985), including at least six books: Jenkins (1975), Erdmann (1976), Milsark (1979), Breivik (1983), Hannay (1985), Lumsden (1988). Haiman (1986:89) is probably correct in suggesting that no single explanation, either formal or functional, will describe the distribution of *there*. To oversimplify a great deal, we can say that non-adverbial *there*-clauses (hereafter *there*-clauses) are often obligatory because of the principle of end-weight, that they usually express existence (hence the name 'existential'), and that in discourse they function as presentatives.

Hetzron (1975:374) defines presentative function as 'calling special attention to one element of the sentence for recall in the subsequent discourse or situation… because the element is going to be used, directly or indirectly, in the ensuing discourse…' In other words, he clearly links presentative function to what Givón (1983:15) calls persistence, the continuation of a topic in subsequent clauses. The more common definition of presentative function stresses not persistence, but simply the presentation or introduction of new information (Breivik 1981:10). According to Breivik (1981:15), the word *there* functions as a signal to the addressee that he must be prepared to direct his attention toward an item of new information.

Relatively little is known about the details of the frequency, distribution, and functions of *there*-clauses in actual texts, and particularly scientific texts. In a study of surgical reports on gall-bladder operations, Pettinari (1983:54) found that *there*-clauses were used to introduce information which did not relate directly to the removal of the gall-bladder. She suggests that *there*-sentences function to provide an alternation for non-thematic information (1983:59). Huckin and Pesante (1988:379) reported that in a 100,000-word corpus almost every postverbal noun phrase in the *there*-clauses (157 of 168) appeared to represent 'brand-new' information in the sense defined by Prince (1981).

This paper aims to extend the text-based work of Pettinari and Huckin and Pesante on the discourse functions of *there*-clauses. It discusses the frequency, structure, and the discourse functions of the non-adverbial *there*-clauses in a 92,000-word corpus consisting of 24 scientific articles, 6 from each of the following journals: *The Canadian Journal of Chemical Engineering, Canadian Journal of Civil Engineering, The Canadian Mineralogist*, and *Canadian Journal of Physics.*

2. FREQUENCY. The overall frequency of *there*-clauses in my corpus—only 58 in 92,000 words—is strikingly lower than that reported for other corpuses:

Rodman	1/1600
Huddleston	1/682
Huckin and Pesante	1/592

It is also lower than the frequencies Huckin and Pesante (1988:385) report for any individual genre:

Reference books	1/261
Technical journals	1/367
Newspapers	1/387
Writing journals	1/724
Nonfiction books	1/1043
Fiction	1/1180
Magazine articles	1/1388

In my corpus the frequency varies somewhat from discipline to discipline:

The Canadian Journal of Chemical Engineering:	1/2545
Canadian Journal of Civil Engineering:	1/1017
The Canadian Mineralogist:	1/1900
Canadian Journal of Physics:	1/1938

Also, fully one third of the articles, including half of the articles in mineralogy and civil engineering, have no *there*-clauses, while two of the articles in civil engineering have quite high frequencies (1/584 words and 1/511 words).

3. STRUCTURE AND FUNCTION. As one would expect, all the *there*-clauses in my corpus function as presentatives in the sense of introducing new information into the discourse. In examining the relationship of each *there*-clause to its discourse context, I asked the following questions:

1. Where in the text paragraph is the *there*-clause located? While initial position in a paragraph won't always be a position of prominence, I expected that a structure whose main discourse function is to be a presentative—to introduce a new element—would also be more common in initial position.

2. How is the introduced element related to the preceding discourse? Does the *there*-clause introduce non-thematic information as Pettinari found?

3. How is the introduced element related to the subsequent discourse? In the sense of Givón (1983), how persistent is the introduced element?

At the same time, I was interested in how various structural characteristics of the *there*-clauses might be related to their use in discourse. Since in discourse there are always a number of syntactic, semantic, pragmatic, and stylistic factors interacting, probably with variable force, it seems unreasonable to expect to find more than tendencies for particular factors to correlate with particular discourse uses. I considered such structural characteristics as whether the clause was a main clause or a subordinate clause, whether or not it included a locative phrase, the type of determiner in the NP, and the type of noun in the NP. The latter two intersecting structural aspects—type of determiner and type of noun—do appear to be relevant to their use in discourse.

3.1. TYPE OF DETERMINER IN THE NP. Although a larger corpus may very well reveal other important subcategories, in this corpus, the two types of determiner that seem relevant to discourse use are: 1. *several, a few,* or a cardinal, and 2. *no.*

3.1.1. *SEVERAL, A FEW,* OR A CARDINAL. Six of the nine *there*-clauses with a determiner that is *several, a few,* or a cardinal—all of them main clauses—are in prominent positions in the discourse and the elements they introduce have extensive persistence in subsequent clauses. Rhetorically, they tend to act as organizing or forecasting statements, and half of these six are not just in topic sentences of paragraphs, but they are also in the first sentences of article sections, as in passage 1:

> (1) *When considering the interaction of waves and current, there are two distinctly different types of interaction that need to be clearly distinguished.* The first type of interaction concerns the modification of surface waves when they travel from a region of zero current into a region where currents exist. Longuet-Higgis and Steward (1960) have analysed this situation using... The second type... (Quick, et al. 1987:197).

The rest of the 10-sentence paragraph discusses the two types of interaction introduced by the *there*-clause. The cardinal *two* of course acts as an organization cue. The adjective *distinctly* and the final clause, *that need to be clearly distinguished*, constitute author comment, most of it emphatic (if redundant). Several of the other *there*-clauses in this group also include adjectives such as *interesting* or *specific* that express evaluative author comment. Most do not include a locative phrase.

While this type of determiner may be a necessary condition for the kind of discourse prominence just noted, it is certainly not a sufficient condition, because the other three *there*-clauses in this group—all found with concrete nouns with 'real world' referents, and all with a locative phrase—are not prominent at all. They are located in the middle of a paragraph, the determiner does not act as an organization cue, and the introduced element has no persistence. Two of these three examples are found in passage 2:

> (2) ... Two of these piles have a 1:10 slope in each of the orthogonal planes. *There are six vertical conductor pipes in the centre between two legs, but towards one side. On the other side of the structure, there are three other additional vertical pipes in a triangular arrangement* (Timco, et al. 1992:819).

3.1.2. ***No.*** In sharp contrast to the *there*-clauses with the first determiner type are the 13 *there*-clauses in which the determiner is *no*, the most frequent determiner in my corpus. Only two of these clauses are in first sentences of paragraphs, neither of them acting as a topic sentence, and the introduced elements have little persistence. Generally the clause includes a locative phrase. Often these clauses constitute a turn or contrast in the argument, as in passage 3, where the *there*-clause in the final sentence is a contrast to the first part of the paragraph:

> (3) For group 1, a visual inspection showed several surface cracks and small cavities in the specimens containing 25 and 19 mm tire chip sizes. These cracks and cavities... No deterioration was observed... *In the group 2 specimen, there were no surface cracks or cavities and no apparent deterioration was observed* (Eldin, et al. 1992:918).

In other words, they function rather like the *there*-clauses in the Pettinari study.

Nearly half (46%) of the *there*-clauses with *no* are subordinate clauses, some used as asides, as in passage 4:

> (4) The initial slopes of the conversion evolution curves show that the overall reaction rate at the start of the process, *where presumably there are no diffusional limitations*, decreases significantly as the temperature goes from 850 to 750 C, implying that a proportionate decrease

is experienced by the intrinsic reaction rate (Krishnan, et al. 1993:249).

3.2. TYPE OF NOUN IN THE NP. As in the Huckin and Pesante corpus (1988:387), there is a relatively high frequency (47%) of nominalizations, such as *agreement, increase,* or *variation.* Usually these clauses include evaluative modifiers, such as *excellent* or *significant.* Most of the locative phrases are abstract ones such as *in the literature,* or *in the experiment.* Somewhat fewer of the *there*-clauses with nominalizations are main clauses (59% vs. 74% of those with other nouns, such as *velocity*). If we exclude the cases already discussed under special determiner classes above, then more of the clauses with nominalizations have a higher persistence of the introduced element than do those with other nouns.

Why might nominalizations be frequent in *there*-clauses and why would they be frequent in scientific texts? Using a *there*-clause allows a sentence such as 5 to become like the corresponding sentence in passage 5a:

(5) The measured model results and the full-scale results agree very well in the region of comparison.

(5)a ...These values have been plotted in Fig. 7. *There is excellent agreement between the measured model results (including the values at a thickness of 1.2 cm representing thick first-year ice) and the full-scale results in the region of comparison* (Timco et al. 1992:828).

As Halliday (1993:15) has observed, in scientific writing nominalizations are very important as a means of allowing the scientist to talk about processes as things; 'where the everyday mother tongue of commonsense knowledge construes reality as a balanced tension between things and processes, the elaborated register of scientific knowledge reconstrues it as an edifice of things'.

Also, as Huckin and Pesante (1988:382) note, placing conjoined NP's after the *there is/are* gives the NP's 'syntactic unity and conceptual unity'. This characteristic is exploited particularly clearly in passage 6:

(6) No important deleterious effect on spouting was apparent at the tallest bed height. *There was an increase in spouting gas flow rate accompanied by a proportionate increase in oil shale flow rate and decrease in residence time.* Hence, more particle carryover was evident at the 96.8 cm bed height (Lisboa, et al. 1992:986–988).

Here, the *there*-clause functions primarily as a means of concisely describing three phenomena more or less concurrently.

4. CONCLUSION. The pragmatics of non-adverbial *there*-clauses are obviously a complex matter, and it seems to me that we can at best expect to uncover that there are tendencies for some aspects of structure to relate to discourse uses. This paper has only discussed a rather small corpus within one genre, the scientific article, in which *there*-clauses are much less frequent than they are in other corpuses. Larger corpuses and other genres may reveal other relationships between structure and function.

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USE AND DIFFUSION OF AUXILIARY *DO* IN INTERROGATIVES AND NEGATIVES IN SHAKESPEARE'S ENGLISH

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1.0 INTRODUCTION. The development of the Present Day English use of auxiliary *do* in interrogative and negative clauses which lack other verbal auxiliaries, and its replacement of an older pattern in which the main verb carried negation or was front-shifted, was happening very rapidly in the years in which Shakespeare was writing. While there is evidence of *do*-support as early as Chaucer (1386) and Caxton (1489)[1], the major period of development of this structure lies between 1500 and 1700, after which time the use of *do* in these contexts may be considered standard (Crystal 1988:201). Shakespeare (1564–1616) is central to this developmental period, and both the old and the new patterns are found in his works, e.g.

> Beleeue not thy disdain... (*All's Well that Ends Well* 979:990)[2]
> Do not beleeue him. (*All's Well that Ends Well* 996:2710).

Over the past century considerable work has been done on factors affecting this significant syntactic change. The work reported here was designed to consider the interactions within a substantial set of such factors, formal, lexical, textual, and social. We investigate the usage of *do*-support in six of Shakespeare's plays using a chi-square-based multivariate statistic, with the goal of a description of factors which influence the presence or absence of *do*-support in particular contexts, and their relationship to each other.

1.1 EARLIER RESEARCH. The origin, development, and spread of periphrastic *do* (including the early usage of *do* in affirmative statements, as well as the usage of do-support in questions and negatives which is the focus of this paper) has been the subject of many investigations from near the end of the last century, for example, Rohde 1872, Harz 1918, and Dietze 1895 (whose data and analyses are frequently referenced in later works) to the present time. Three large-scale and important studies in the field from this century are Engblom 1938, Ellegard 1953, and Stein 1990, with Ellegard 1953 being regarded as the classic in the field and used as a point of departure for many subsequent studies, including Stein 1990.

Englblom 1938 focuses on the origin and early development of periphrastic *do* and classifies a great deal of textual material. Ellegard 1953 examines a large number of periphrastic *do* contexts from texts of different historical periods and compares the usage of *do* in different syntactic environments. Stein 1990 looks at the evolution of *do* from a functional perspective, and considers how the semantics of *do* (including its usage for social or discourse purposes) can explain the syntactic facts of its rise and spread.

The popularity of *do* as a research topic is easy to understand. In the first place, it is an accessible topic. For example, the change from no *do*-support to some *do*-support to full *do*-support takes place mainly during a conveniently-sized 200 year period from which we have available numerous texts from important authors, many of which have already been arranged into research corpora. Moreover, there is a wealth of research whose data, analyses, and ideas indicate that the full story of *do* will, when it is told, not be a simple one. Perhaps the main attraction of periphrastic *do* as a research topic lies in its interest as a puzzle to linguists because of the many different types of factors which have, or appear to have, played a role in its origin and development.

Various types of influencing factors considered in earlier research are summarized below. Though the factors with corresponding references are listed separately, it should be kept in mind that the overlapping of influences is certainly recognized and may have been investigated in these same works. The discussion below is mainly concerned with those influences affecting the spread rather than the origin of *do*, with *do*-support in questions and negatives rather than other manifestations of periphrastic *do*, and with developments relevant to Shakespeare's time, all of which topics are the focus of the current investigation.

1.2 FACTORS ASSOCIATED WITH THE DEVELOPMENT OF PERIPHRASTOC *DO*.

Factors associated with the development and spread of periphrastic *do* which have been discussed in previous literature include candidates from all levels of language. What follows is a brief sketch of some of the major proposals and findings.

Stein 1986, 1989 shows phonotactic influences through his demonstration that auxiliary *do* seems to have first been selected most frequently in second person singular inflected forms, especially in verbs with stem-final obstruents; in such cases complex word-final consonant clusters on the main verb were avoided by selecting and inflecting *do* instead. This usage seems next to have spread by analogy to second person plural forms, and then to other forms.

Grammatical conditioning factors are associated mainly with the development of modern English SVO word order; e.g., from desire to avoid a VSO structure resulting from a front-shifted main verb, a negative form intervening between V and O, or a sequence of adjoining unstressed words such as *not* and a subject and object pronoun (Ellegard 1953, Kroch et al. 1982, Kroch 1989, inter alia). A second grammatical influence proposed is the strong analogical pattern of the modal auxiliaries (Warner 1993). The impact of word-order considerations is also viewed from the perspective of required processing resources in Kroch et al. 1982 and Kroch 1989, which consider the comparative demands of processing constructions based on the nature of their violation of SVO word order.

A variety of stylistic factors has been proposed as influences on the use of *do*. Salmon 1965, associates *do* with a formal style reflecting social distance between participants in a speech situation, and also links the usage of *do* in imperatives to emphatic and emotionally intense situations. Stein 1990 discusses the development of periphrastic *do* with reference to discourse structure, including its use to signal foregrounding, and also suggests that its use in negative non-interrogatives in the Shakespeare corpus may be influenced by its implication of 'intensity' (178).

A final factor proposed to have influenced the use of *do*-support is which lexical verb is involved; for example, in the period of interest to our study, *be* and *have* never take *do*-support, and some verbs are more resistant to *do* than others. This resistance may be based on the verb's subcategorization properties which involve it in the word order considerations discussed above, on the verb's phonetic shape (also see above), or on its individual semantics or usage. For example, some verbs are used in fixed collocations which tend to, or always, favour one *do* option over the other, while some individual verbs occur significantly more often with one option than the other. Examples are found, inter alia, in Salmon 1965 and Barber 1976.

1.3 THE PRESENT STUDY AS A COMPLEMENT TO EARLIER RESEARCH. The intention of the present study was to use a hierarchical statistical analysis to consider the interaction and relative importance of a range of influencing factors on the use of *do*-support. While counts of relative frequencies of the use of periphrastic *do* are found in earlier works (e.g. Dietze 1895, Engblom 1938), rigorous quantitative studies begin with the careful and complete collections and calculations of Ellegard 1953, who tabulated the relative frequency of *do* under a number of variable conditions. Kroch et al. 1982 then used a multivariate analysis technique to 'distinguish the true effects on a grammatical alternation of correlated sets of constraints, where raw percentages can be misleading' (292).

Based on relative frequency counts and systematic examinations of context, some influences on *do* have been shown to be stronger than others. Information of this sort can be interpreted from many of the frequency summaries presented in the literature, and some works, notably Stein 1985, which considers textual, structural, and phonotactic influences on *do* usage, do a good job of presenting complex related interactions. However, we are not aware of any study which has attempted to statistically rank hierarchically the relative importance and interaction of a range of influences on the use or non-use of *do*-support. Though the present investigation used a comparatively small corpus, and represents only the first attempt at the best selection of variables, variable-values, and statistical procedures, we hope it will make a contribution toward the integrative approach to the description of *do* in line with the general direction of recent research.

2.0 METHODOLOGY OF THE STUDY.

2.1 THE CORPUS. Our corpus consisted of 965 tokens drawn from six of Shakespeare's plays. Dramatic texts were chosen for analysis in the hope that they would mirror the perceived normal speech of a range of characters from the period, and thus reveal any uses of *do*-support based on social constructs such as social class, gender group, or formality of the speech setting. Shakespeare was the dramatist selected, in part because considerable textual analysis of his work already exists, but primarily because of the unarguable excellence of his portrayal of character through dialogue.

The plays selected and their dates[3] are: *Two Gentlemen of Verona*, 1594 or 1595; *All's Well that Ends Well*, c. 1602–1604; *Romeo and Juliet*, 1594–1596; *Othello*, c. 1602; *Richard III*, 1592–1593; *Henry V*, 1599. All interrogative and negative clauses which, in the absence of other auxiliaries, could show *do*-support were collected. The relevant constructions were negative and affirmative wh- and yes/no questions, negative imperatives, and negative declaratives.[4] The old (no *do*-support) and new (*do*-support) patterns for these six structures are illustrated below:

AFF WH	*...but why weare you your Leeke to day?* (*Hen* 666:2760)
	Why doest thou spitte at me? (Rich 212:300)
NEG WH	*Why followed not... Thy father or thy mother?* (*R&J* 397:1700)
	Why didst not tell me sooner? (*Two Gent* 18:1390)
AFF Y/N	*Talke you of killing?* (*Oth* 961:2930)
	Doth Siluia know that I am banished? (*Two Gent* 16:1230)
NEG Y/N	*...knowes he not thy voice?* (*All's Well* 987:1770)
	...doth she not giue vs thanks? (*R&J* 402:2070)
NEG DC	*For my part, I care not...* (*Hen* 643:480)
	You do not know him my Lord as we doe... (*All's Well* 986:1680)
NEG IMP	*Fathers... trust not your Daughters mindes* (*Oth* 930:170)
	Doe not name Siluia thine... (*Two Gent* 26:2150)

2.2 VARIABLES AND VALUES. Each token in the final corpus was associated with the relevant value of fourteen variables analyzed in the study. The variables and their potential values are given below, together with a brief description of the rationale behind their selection. An indication of the frequency distribution of the main instances for each variable is also included. While the goal of the study was to investigate the interactions of variables, a number of the individual variables showed interesting and significant ($p = <0.05$) association with the presence or absence of *do*-support. In these cases, the percent of *do* is also reported, and should be viewed against an overall 30% average of *do* use for the entire corpus.

VARIABLE 1. PRESENCE OF *DO*. Tokens which showed *do*-support were contrasted with those that did not. Status of *do* was the dependent variable in the statistical analysis. For the whole corpus, 284 of the 965 tokens (or, as noted above, about 30%) used auxiliary-*do*.

VARIABLE 2. WHICH PLAY. Tokens were coded according to which of the six plays they occurred in. We explored possible sub-genre effects by choosing two plays each from the comedies, tragedies, and histories. Prior research evidence of a play, sub-genre, or date effect on *do* usage is equivocal. Stein 1985 suggests that such sub-genre differences are unimportant, but we thought it worthwhile to investigate whether any of the high-style (vs. colloquial) associations with *do*, which were suggested as a feature of earlier writing (Brook 1976), still existed in Shakespeare.

Hope (1994), in his statistical study of the authorship of Renaissance English plays, reports that Shakespeare consistently uses less auxiliary *do* than other contemporaneous Elizabethan/Jacobean dramatists; in fact, the range of Shakespeare's *do* use in the fourteen plays tabulated by Hope does not overlap that of the other five dramatists studied. However, across Hope's Shakespeare corpus the use of *do* varies by play, without apparent reference to date or sub-genre. (Direct comparison of numbers between our study and Hope's is not possible since he included tabulation of affirmative *do*.) Our further exploration of this variable as related to specific plays and characters thus seemed worthwhile, especially in light of observations (Salmon 1965, Stein 1990) that the Henry plays in particular show heavy *do*-support.

The number of tokens per play in our corpus ranged from 113 in *Henry V* (27% using *do*) to 204 in *Othello* (43%), with *Richard III* having 193 (23%), *Romeo and Juliet* 163 (26%), *All's Well that Ends Well* 150 (32%), and *Two Gentlemen of Verona* 142 (22%).

VARIABLE 3. WHICH STRUCTURE. Tokens were coded according to which of the six negative or question structures they occurred in. Differences in the rate of adoption of *do* in different structure types (reflected in frequency of occurrence differences) are well-known and have been documented for a variety of textual samples. Ellegard's enormous corpus (1953), which is comprised of a variety of texts from the years 1390-1700 (although it should be noted that it avoids dramatic texts), shows that during Shakespeare's time the percentage of auxiliary-*do* is highest in negative questions, followed by affirmative questions, negative declaratives, and negative imperatives. Although Ellegard's categorization of question types does not exactly correspond to ours, his findings and those of others have shown clearly that structure type is significantly correlated with the spread of *do*-support. Our interest was in the possible interaction of the spread through various structure types with other variables investigated in this study.

Our corpus contained a large number of affirmative questions (259 affirmative wh- and 167 affirmative y/n, 26% and 50% *do* respectively), and of negative declaratives and imperatives (313 negative declaratives and 173 negative imperatives, both 22% *do*), but had rather low token counts for both types of negative questions (12 negative wh- and 41 negative y/n, 25% and 51% *do*).

VARIABLE 4. WHICH SPEAKER. Sociolinguistic research from recent decades, particularly following the pioneering works of Labov (1966, 1972) and Trudgill (1974), have identified the individual characteristics of speakers as having a significant effect on linguistic usage. We considered the possibility of individual preferences in the use of *do*, and tabulated the use of *do*-support by individual speakers for all characters (13 in number) who produced 20 or more tokens. We called these main characters. The number of tokens per main character ranged from 20 to the highest numbers of 60 (King Henry in *Henry V*), 62 (Iago in *Othello*), and 66 (King Richard in *Richard III*), and these main characters differed significantly in their preference for *do*. A minor character class was established for all those characters with 1–19 tokens, and this class accounted for more than half of the corpus (501 tokens).

We had hoped that the speaker variable would also be revealing of linguistic differences among character types (for example, clown roles vs. others), which could have cast light on hypotheses about stylistic uses of *do*. However, low token frequencies prevented the best test of this.

VARIABLES 5–10. GENDER AND SOCIAL CLASS OF SPEAKERS AND HEARERS. Potential preferences for *do*-support use based on an individual's membership in a social group were explored by coding each token according to the gender and social class of the speaker and the hearer. In the speaker's gender category (VARIABLE 5) and the hearer's gender category (VARIABLE 6), besides males and females, an 'other' class was used for those cases in which speaker or hearer was a group or chorus; in which the 'speaker' was actually some kind of text (such as a message or letter); or in which hearer was 'self' or the audience (as in an aside), God, an animal, or some kind of abstract entity (as in Hellen's speech to 'bullets', *O you leaden messengers…* (*All's Well* 983:1420).

In the corpus, most speakers were male (76%, with 28% *do* tokens) compared to female (23%, with 36% *do*), while the 'other' class was nearly empty. Hearers were also predominantly male (59%) compared to female (20%), with the 'other' class (21%) comprised mostly of examples of utterances addressed to groups of people. The hearer's gender variable was not significantly associated with *do* usage.

In the speaker's social class category (VARIABLE 7) and the hearer's social class category (VARIABLE 8) characters were assigned to one of three social classes, or to an 'other' default class, according to the following rather loosely defined scheme: titled members of the aristocracy constituted the upper class; the middle class included clergy, civil officials, characters designated as Gentlemen or Gentlewomen, or those 'of good family'; the lower class included characters involved in service positions (e.g, those identified as Interpreter, Nurse, Messenger, Servant, etc.), clowns, and criminals (e.g., Murderer, Outlaw); the 'other' class was comprised of groups, 'self', young children, animals, and abstract entities. While these are rough categories, we hoped that a broad classification in a corpus of this size would have the potential to indicate the presence or absence of social-class conditioning in *do*-support usage.

Among speakers, most were assigned to the middle class (52%), followed by upper class (34%) and lower class (12%). Upper class speakers used significantly less *do*, 24% compared to 32% for middle class and 33% for lower. The 'other' class accounted for only 20 of 965 tokens (2%). Among hearers, the middle class was also the largest (43%). Hearers classified as 'other' (as in the case of speeches addressed to groups) accounted for 21% of the corpus, followed by upper class (20%) and lower class (17%). Hearer's social class was not a significant variable in our study.

Since speakers may adjust their speech depending on who it is that they are talking to, we explored the potential effect of the relationship between the speaker and the hearer by coding for gender dyads (VARIABLE 9) and social class dyads (VARIABLE 10). Gender dyads were male to male, male to female, etc. Social class dyads were upper class to upper class, upper class to middle class, etc. The male-male class accounted for the majority of tokens in the gender dyad category (48%), followed by male-other (16%), mostly cases when a male speaker was addressing a group. In the social class dyad category, the middle-middle class was the largest (31%) followed by upper-upper (12%). Both of these variables were significant, but provided primarily a more fine-grained analysis of the speaker variable.

VARIABLE 11. WHICH VERB. The relative resistance of certain individual verbs and verb classes (e.g., transitive vs. intransitive, strong vs. weak) to do-support has been noted above in the discussion of previous research. To look at the influence of individual verbs and verb classes we coded the lexical main verb of a token when that verb occurred in 10 or more tokens. The following 17 verbs were of this 'major verb' type: *be, care, come, do, doubt, fear, have, hear, know, let, like, look, love, mean, see, say, think.* The remainder of the lexical main verbs in the corpus (those having a frequency of fewer than 10) were grouped together in a 'minor' class; nearly half of the tokens in the corpus contained verbs from the minor class. The lexical verb variable emerged as the most important predictor of *do* in the corpus in the multivariate analysis, and will be discussed below.

Variables 12 and 13. subject and complement types. The influence on the use of *do*-support of various aspects of syntactic context has been a main focus of previous research (Engblom 1938, Ellegard 1953, Kroch et al. 1982, Kroch 1989, inter alia). We tried to explore a variety of potential influencing factors through a detailed scheme of coding subject and complement types.

Subjects classified as pronominal (personal, deictic, existential) or nominal accounted for 77% of all subject-types, and exhibited 31% *do* support, very close to the average for the whole corpus. Zero subjects, used for the understood subjects of all imperatives were 18%, with 22% *do.* The remaining subject classifications of relative pronoun and 'not supplied' (which covered those cases in which the subject of a previous clause was not repeated in the potential *do*-support clause or in which the subject was marked only on the verb) were rather infrequent, and together accounted for 5% of the tokens.

Following Quirk and Greenbaum 1973 we interpreted verb complements in the most general sense, as elements following the verb without which the sentence is judged as incomplete. We hoped that complement type, in addition to showing other effects of post-verbal structure on *do*, would reveal transitive vs. intransitive verb differences that did not fall out of the 'which verb' variable (since many lexical verbs can act in either role). Analysis of complement type in English always raises the question of the status of phrasal verbs. We distinguished phrasal verbs using a combination of syntactic and semantic tests including passivizability, amenability to particle movement, and possibility of single-word synonymous verb substitution.

Complements were classified as belonging to one of the following main categories (percentages of occurrence are given in brackets): noun phrase complements (26%), pronouns (21%), wh-complements (e.g, *What said she?*) (18%), no complement (16%), and sentential complements (8%). The other complement categories, including prepositional phrases, adverbs, infinitives, adjectives, and 'not supplied' (in the case where the referent is implied from a previous clause) did not account for a significant percentage of tokens, totalling 11% combined. Complement emerged as a significant player in the multivariate analysis, and will be discussed below.

Variable 14. formality of the discourse. Finally, for those cases in which a second person pronoun was used for the addressee (representing about half of the corpus) we coded tokens as belonging to 'formal' or 'informal' speech based on the *you* (formal) / *thou* (informal) distinction. This is of course a rather rough measure of formality, but we believed that it at least might permit a non-subjective measure of the notion of formality, and provide information complementary to that gathered through the variables concerned with 'which speaker' and 'social class'. In fact, it revealed nothing new about *do* and the level of formality since tokens with *thou* as addressee and those with *you* occurred with almost the same frequency of *do* (35% and 37% respectively). However, it proved to be an interesting individual variable from another point of view; the combined *thou/you* class contrasted significantly with all other tokens, which occurred with only 23% do. This finding correlates nicely with Stein's 1990 evidence, noted above, of the influence of phonotactic constraints on the early spread of *do* in second person forms.

2.3 STATISTICAL ANALYSIS. The role of these variables in predicting *do*-support was assessed using the CHAID (Chi-squared Automatic Interaction Detector) program of SPSS (Statistical Package for the Social Sciences).

Given a dependent variable (presence of do) and associated independent variables to be investigated in relation to it (those described as VARIABLES 2–14 above), the CHAID program splits the corpus tokens into two or more groups based on the best predictor (sig. $p<0.05$) of the dependent variable from among the independent variables. Membership within a best predictor group results from a merging based on p-value similarity compared to the p-values of members of other groups. The program runs iteratively/hierarchically such that each group in a preceding level is then considered for splitting based on the best predictor of the dependent variable for members of that group.

We set up our analysis to display the best predictor of the occurrence of auxiliary-*do* in a sentence or clause from among the 13 potential conditioning factors described above, then the best predictor of auxiliary-*do* when that factor is basically held constant, and so forth. The program output is a tree structure showing, in hierarchical and interdependent form, the impact of the independent variables on the dependent variable. Given our corpus of 965 tokens, we set the program parameters so that groups of fewer than 50 tokens were never split, and no group resulting from a split would contain fewer than 25 members. Thus generalizations about the data are true for at least 25 of the 965 tokens.

CHAID was an excellent analytical tool for the analysis of a data set like ours in which a variety of potential influencing factors were certain to interact with each other. Its multi-level approach and ability to derive subgroups that are 'mutually exclusive and exhaustive' (Magidson 1993) allowed us to effectively explore secondary effects. For example, if lexical verb is a very strong predictor of *do*-support, then it is difficult to search for social conditioning effects unless lexical verb is basically held constant (the effect of splitting beneath a subgroup).

3.0 RESULTS OF THE STATISTICAL ANALYSIS. The results of the statistical analysis are displayed in the annotated CHAID analysis tree diagram in Fig. 1. The CHAID analysis tree, reading from root (at the top of the diagram) to the lowest node, shows the variables that are significant main predictors of do-support and their interaction. The major variables are: (1) the lexical verb, (2) structure, (3) complement type, (4) speaker's social class, and (5) play.

As noted above, simple two-way chi-square analyses of any single independent variable with *do* (e.g. *do* x verb, *do* x structure, etc.) find many other significant correlations; in fact, all variables except hearer's gender and social class are significant at least at the level of $p = <0.05$ for the corpus as a whole. However, the CHAID analysis gives a far more accurate description of the situation because it takes into account the interactions of the various influencing factors.

4.0 INTERPRETATION OF THE RESULTS. The picture that emerges from the CHAID analysis shows a complex interaction of the five variables noted above. We interpret from the analysis that the main predictor of do-support in our corpus is the lexical verb, followed by structure and complement type. The effects of each of these influencing factors, and of what we interpret to be the less significant factors of speaker's social class and play are discussed below, both separately and in terms of their interactions.

4.1 VERB EFFECTS. Perhaps the main finding of our analysis is that lexical verb is the best predictor amongst the range of possibilities. This finding should be taken in context, in that the lexical verb is related to other factors such as structure (because of their semantic/pragmatic features, some verbs are more likely than others to occur in, for example, questions vs. imperatives), or speech situation (in that some verbs are more likely to belong to particular topics or the speech of particular types of characters). Nevertheless, that lexical verb comes out at the top of a hierarchical analysis is important.

The verbs separate into 4 groups with respect to their likelihood of taking *do*-support. From most conservative (no *do*) to most innovative (most *do*), these groups may be summarised as follows, again bearing in mind that about 30% *do* is the average for the entire corpus.

GROUP 1	This group consists of the verbs *be, do, have, let*. None of these verbs occur with *do*-support in any of the tokens of the corpus. (n = 127)

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GROUP II	Verbs in this group are *care, come, fear, look, say.* They average 12% *do*-support. (n = 119)
GROUP III	Verbs in this group are *doubt, know, think.* They average 29% *do*-support. (n = 156)
GROUP IV	Verbs in this group are *hear, like, love, mean, see,* and the minor class of 216 different verbs which each occur fewer than 10 times. Group IV averages 40% do-support. (n = 563).

As noted above, the influence of the lexical verb on the usage of do-support has been widely discussed in the literature (see Rohde 1872, Dietze 1895, Ellegard 1953, Barber 1976, Stein 1990). Verbs have been considered more or less resistant to *do* based on their transitivity, grammatical roles (note the auxiliary or auxiliary-like status of our group I verbs), phonological composition, usage in common or fixed collocations, speakers' unconscious attitudes, and analogy. However, it is difficult to compare many specific lexical verbs across these earlier studies with our results for several important reasons: the studies are not congruent in the structures or contexts assessed (e.g., some include affirmative *do* and some do not; Stein (1990) focuses on second person contexts); the chronological periods studied are not equivalent (the adoption of *do*-support was moving very rapidly between 1500 and 1700); and, as Hope (1994) has shown, *do* usage, even within a similar chronological period, appears to be significantly idiosyncratic to individual authors.

The resistance of our group I verbs was anticipated (and it is interesting to note that some dialects still resist *do* with *have* in questions and all dialects resist *do* with *be* anywhere except in negative imperatives). An advantage of the CHAID analysis is that it dropped these verbs from further analysis. It is more difficult to draw immediate conclusions about the results represented by the partition of the remaining verbs in the corpus into groups II (conservative), III (intermediate), and IV (innovating). Members within these groups do not exhibit any obvious commonalities. A more detailed statistical analysis combined with a systematic review of the individual tokens may cast light on why these verbs cluster as they do.

It is possible, however, to comment briefly on some individual verbs. Of note may be the following. (1) While *look* is not generally considered amongst the conservative verbs (see Dietze 1895, Engblom 1938, Ellegard 1953, and Barber 1976), it seems to have got into our group II based on its favoured usage in phrases referring to someone's appearance, e.g., ...*why lookst thou sad?* (*R&J* 393:1290). Other verbs appear to show collocation-sensitive patterning as well, though a systematic analysis was not undertaken in the present investigation. (2) The verbs *hear* and *mean,* considered resistant in question structures (Barber 1976), come out as innovative in our analysis, which considered negative imperatives and declaratives together with questions, suggesting the importance of structure effects. *Know*, also, which comes out as a great innovator in Ellegard's analysis of questions (showing about 86% *do* usage mainly in yes/no questions), patterns with our intermediate group across all the structures considered in our corpus. (3) Of the three most frequent individual verbs in our corpus, one is conservative (*say*) and two are intermediate (*know, think*). However, the less frequently occurring verbs (fewer than 10 tokens) which make up the minor group fall in the innovative group.

Perhaps the two most important interpretations we make of the primacy of the lexical verb effect in our analysis are the following. The verb effect indicates strongly that the syntactic innovation of *do*-support spread by a process of lexical diffusion through the verb stock, encouraged or inhibited by a variety of factors. The partitioning of the corpus verbs into groups based on how advanced they are in the syntactic change allows us to view, through the CHAID analysis, what other strong predictors were at work in the process. The most notable of these are structure effects.

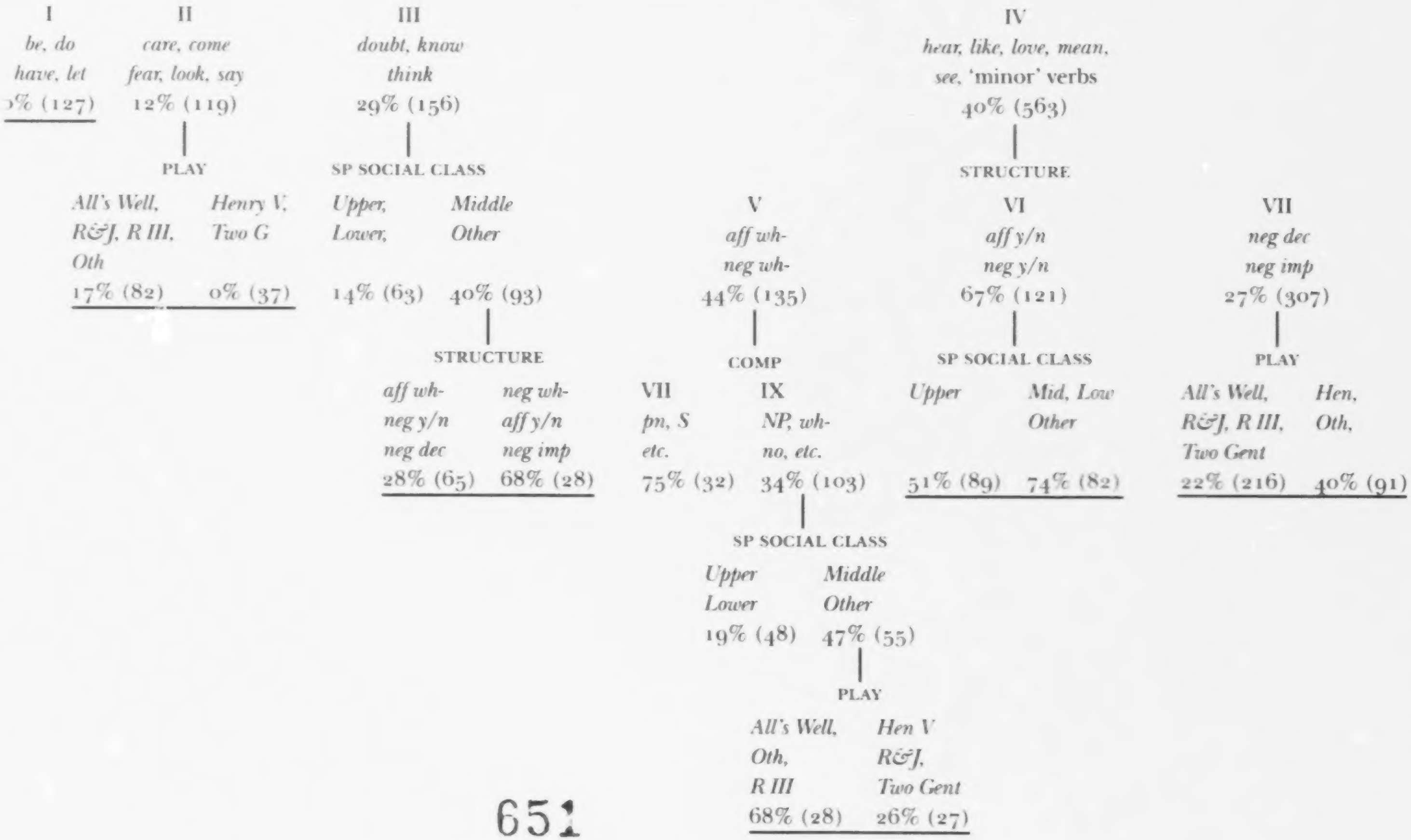
4.2 STRUCTURE EFFECTS. In the largest and most innovating verb group, structure is shown to be a predictor at level two of the analysis tree, according to the 3-way distinction shown below.

GROUP V	Wh- questions, both affirmative and negative; 135 tokens, 44% *do* usage
GROUP VI	Yes/no questions, affirmative and negative; 121 tokens, 67% *do* usage
GROUP VII	Negative declaratives and imperatives; 307 tokens, 27% *do* usage.

This is a strong and interesting result, and shows a clear and explicable structure effect in our corpus. All questions (groups V and VI above) are better predictors of *do* than non-question negatives, and the questions divide by type with yes/no questions more advanced in the use of *do* than wh- questions.

A second structure effect occurs in the third level of the analysis tree. It results from tokens with the verb group of *doubt, know*, and *think* uttered mainly by middle class speakers, and shows a different pattern which groups affirmative yes/no questions, negative imperatives, and negative wh- questions together in contrast to affirmative wh- questions, negative declaratives, and negative yes/no questions. The former group uses 68% *do* and the latter 28%. These are rather anomalous groupings, and are at best a weak finding since they are based on very few tokens (28 and 65 respectively). If they suggest anything, it is that we can only see clear structure effects when this variable is as-

Figure 1. CHAID analysis tree, showing structures of the groups produced by the analysis, the variables occuring in them, the percent of *do* use, and the number of tokens


I
be, do
have, let
% (127)
II
care, come
fear, look, say
12% (119)
PLAY
All's Well,
R&J, R III,
Oth
17% (82)
Henry V,
Two G
0% (37)
III
doubt, know
think
29% (156)
SP SOCIAL CLASS
Upper,
Lower,
14% (63)
Middle
Other
40% (93)
STRUCTURE
aff wh-
neg y/n
neg dec
28% (65)
neg wh-
aff y/n
neg imp
68% (28)
IV
hear, like, love, mean,
see, 'minor' verbs
40% (563)
STRUCTURE
V
aff wh-
neg wh-
44% (135)
COMP
VII
pn, S
etc.
75% (32)
IX
NP, wh-
no, etc.
34% (103)
SP SOCIAL CLASS
Upper
Lower
19% (48)
Middle
Other
47% (55)
PLAY
All's Well,
Oth,
R III
68% (28)
Hen V
R&J,
Two Gent
26% (27)
VI
aff y/n
neg y/n
67% (121)
SP SOCIAL CLASS
Upper
51% (89)
Mid, Low
Other
74% (82)
VII
neg dec
neg imp
27% (307)
PLAY
All's Well,
R&J, R III,
Two Gent
22% (216)
Hen,
Oth,
40% (91)

sessed across a variety of tokens, as is the case when the large class of 'minor' verbs is involved.

4.3 COMPLEMENT EFFECTS. The analysis shows a split with respect to two major classes of complement types at the third level of the CHAID tree. If complement types with low token counts are left out (those accounting for less than 4% of the corpus), the results are as shown below.

GROUP VIII	Pronominal and sentential complements, 75% *do*
GROUP IX	Noun phrase, wh-, and no complements, 34% *do.*

Several points of interest should be noted in regard to this result. (1) The complement results (given their place in the analysis tree) apply to the innovating group of lexical verbs in mainly affirmative wh- questions structures (there being so few negative wh- question structures that they are inconsequential). It appears that complement effects become significant only when there is sufficient *do* usage due to an innovating verb group and advanced structure effects. (2) The lower *do* usage for intransitive verbs (those with no complement) may be explained in part because VS structures are more acceptable than VSO structures after inversion, given a canonical SVO word order (Ellegard 1953). On the other hand, the sentential complement forms might have been expected to pattern with the intransitives since there is no Verb-Complement adjacency requirement (Kroch 1989), but they did not do so in our corpus. (3) It is difficult to assess the noun phrase vs. pronoun complement split in our data without knowing the status of the subject (noun phrase or pronoun) in each case, since subject and object will appear in combination in transitive sentences with varying effects on the usage of *do.* CHAID did not identify a subject effect on *do* in our corpus, which would have been expected independent of other factors based on word order considerations (Kroch 1989). However, further testing of noun phrase/pronoun subject-complement dyads may help us to interpret our complement findings more exactly. Again, it is worth remembering that at this level of the analysis tree we are interpreting on the basis of rather low token counts, fewer than 32 in group VIII and 103 in group IX.

4.4 OTHER EFFECTS. Two other variables show as significant in the CHAID analysis tree: speaker's social class and play. Reference to Fig 1 will show that both occur at the second and lower levels of the tree under various verb classes.

While speaker's social class does appear as a predictor in several branches of the tree, we consider it to be less significant than the three major variables discussed above in terms of the analysis as a whole. However, it still presents an interesting result. Middle class speakers appear to pattern consistently as more innovative with regard to the *do*-form compared to upper class speakers. (See Fig. 1.) In offering an explanation for this finding, it is perhaps worth considering whether the main characters of King Henry and King Richard, who both have very high token counts, may have been individually unrepresentative and thus somehow have skewed the picture of the upper class. Both characters have very low *do* usage: 15% for Henry and 20% Richard. However, the picture may also (or in addition) be a reflection on the colloquial and vernacular nature of *do* usage at this period, and so suggestive of class stratification. We present both of these suggestions only as ideas to be pursued further, rather than as strong conclusions, based on the limitations of our study.

While play comes up as a predictor in three branches of the CHAID tree (see Fig. 1), we consider it to be uninterpretable since it does not pattern similarly in any of the three instances. When play is considered as a single variable, there is a suggestive difference on the basis of date: the three earlier plays show a range of *do* usage between 22%–26%; the three later plays between 27% and 43%. This is congruent with Stein's 1986 observations on chronological effect in the Shakespeare corpus (although not with Hope 1994, using a slightly differently consitituted corpus). However, under the influence of higher branches of the tree (verb class, structure, and speaker's social class) this distinction does not hold up in the multivariate analysis of a corpus of our size. Perhaps we may conclude that plays are, linguistically at least, basically a collection of what people say in certain situations, and that play differences may be the result of different individuals saying different things using different structures and different verbs.

5.0 LIMITATIONS AND FUTURE DIRECTIONS. Some of the limitations of this study have been discussed above, chiefly concerning the desirability of redefining or expanding variable values in specific cases, or adding variables such as type of speech situation (serious, clowning, etc.) which in this study proved difficult to identify objectively. As well, it would be useful to pursue a more detailed analysis of the interactions of subsets of variables, and the following seem obvious cases: subject-complement dyads, lexical verb x structure x complement, play x verb, play x speaker x social class, and social class x speech situation.

In several cases in the present study, interpretations of interesting hints about the significance of variables foundered on the rock of a too-small corpus. Although 965 tokens initially seemed adequate for a multivariate analysis, it is clear that the addition of more plays would improve the possibility of teasing out complex interaction effects. It would also be of interest to add some quite late plays of a different type, and *The Tempest* and *A Winter's Tale* immediately suggest themselves.

Finally, in a multivariate analysis study of this type, the tokens became decontextualized. As a result, conditioning of *do*-support which may be influenced by surrounding sentences is not evident. For example, there are many cases in which a linked series of tokens (sharing a verb, or part of a chain of thoughts) show what may be stylistic variation, in their alternation of *do* and non-*do* forms. Two examples are:

> *God's will, I pray thee wish not one man more… No 'faith, my Couze, wish not a man from England… O, doe not wish one more…*
>
> (These tokens occur within 11 lines of a long speech by King Henry to the Earl of Warwick, *Hen* 660:2170.)

> *Speake not, replie not, do not answere me.* Capulet to Iuliet, *R&J* (402:2090).

However, lexical factors as well surely interact, as in the following lines spoken by the Interpreter in a passage from *All's Well*, 990:2100:

> *What say you to that? …What say you to this? What do you know if it?*

Such alternation may also be a tool for emphasis, as in the following dialogue from *All's Well* (973:480):

Countesse to Hellen:	*Do you loue my Sonne?*
Hellen:	*Your pardon noble Mistris.*
Countesse:	*Loue you my Sonne?*

In conclusion, while there is much about the topic still to be said, what has been shown in this paper is how complex the interactions are that govern the use and diffusion of auxiliary *do* in the language of Shakespeare's characters. We hope that our analysis has been useful in elaborating the results of other researchers, suggesting some questions for further pursuit, and showing the advantages and drawbacks of the statistical method we employed.

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[1] Citations from the OED, 1989.

[2] Citations for line location are from the primary text, and refer to page number and preceding main line (lines are numbered by tens).

[3] *The New Century Shakespeare Handbook*, ed. Sandra Clark. Englewood Cliffs NJ: Prentice Hall, 1974.

[4] Certain types of possible candidate constructions were excluded from the final corpus. These included syntactically affirmative declarative forms functioning as questions, and the few cases of ellipsis in which it was unclear whether the usage of do was as an auxiliary or as a replacement main verb (e.g., *He sayes thou toldst him… I know thou didst not. Oth* 963:3070).

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HISTORY OF JAPANESE LOANWORDS IN ENGLISH

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1. Introduction. About 500 words of Japanese origin are recorded in standard English dictionaries (Cannon 1981, 1994). The purpose of this paper is to trace the history of the contact between the Japanese and English languages, focusing on Japanese loanwords in English. The data presented here were obtained from desk as well as standard dictionaries including the Oxford English Dictionary (OED).

What makes language contact between English and Japanese unique is that the two unrelated languages have never been spoken on the same soil as a result of colonization. Most Japanese loanwords in English have entered English through printed media.

Section 2 contains sources of my data. Section 3 describes the history of Japanese loanwords in English. Section 4 gives a brief analysis of them, and in section 5 I offer my conclusion.

2. Sources of material. In order to get an idea what kind of Japanese loanwords in English are relatively common, I checked all the Japanese loanwords in English in Merriam Webster's Collegiate Dictionary Tenth Edition in 1994 (W10) for which Tables 1 and 2 show an exhaustive list. Tables 3 and 4 show yet another list of Japanese loanwords after 1960 from The Barnhart New-Words Concordance (1994). This is compiled from the following publications devoted to reporting new words in English:

The Barnhart Dictionary Companion (quarterly) (1982–1993) (DC)
The Barnhart Dictionary of New English Since 1963 (1973) (BDNE1)
The Third Barnhart Dictionary of New English (1990) (BDNE3)
The Oxford Dictionary of New Words (1991) (ODNW)
The Longman Register of New Words (1989) (LRNW)
12,000 Words—A Supplement to Webster's Third New International Dictionary (1986)
The Macquarie Dictionary of New Words (1990)

I also used the following dictionaries:

The Merriam-Webster Book of Word Histories (1976) (MWWH)
Morris Dictionary of Word and Phrase Origins (1988)
The Oxford English Dictionary (1989) (OED)

Random House Dictionary of the English Language (1978)
Webster's Third New International Dictionary of the English Language (1968) (W3)

All dates in parentheses in this paper indicate the dates of the earliest citations for Japanese loanwords in English, mainly from W10 and BDNE3, supplemented by OED.

3. HISTORY OF JAPANESE LOANWORDS IN ENGLISH. The Portuguese were the first Europeans to trade with the Japanese. In 1549 they started their missionary activities from their base on the island of Hirado off the coast of Kyushu. In 1609 Jesuit missionaries published the first Japanese-Portuguese Dictionary. *Bonze* 'a Buddhist monk' by way of Portuguese *bonzo* (< Japanese *bonso*) entered English literature in 1588 (Serjeantson 1935:239). The first Englishman to land in Japan was William Adams (1564-1620). Adams, shipwright and entrepreneur, was rescued from a Dutch ship off the coast of Japan in 1600 and later became the hostage-advisor and confidant of Ieyasu Tokugawa, the first Shogun (Sonoda 1975). Among the Japanese words found in his letters were *wacadash* (1615) 'a short Japanese sword' from Japanese *wakizashi*, and *inro* (1617) 'a small compartment container hung from an obi to hold small objects'. The English left Hirado in 1623 after they failed to secure the right to trade with Japan which was instead given to the Dutch. In 1638, at the height of the Age of Exploration, all Europeans except for the Dutch were expelled from Japan. The shogun saw the rise of Catholicism as a real threat to the political stability of the nation. The Dutch were merchants and were able to convince the Japanese authorities that they were not only at war with the Spanish but that they were anti-Catholic as well. Japanese nationals were also not allowed to travel abroad (Hosley 1990). Foreign trade came under the direct control of the central government, and the VOC (Dutch East India Company) was told to move its trade settlement to the artificial islet called Deshima (lit. 'protruding island') near Nagasaki. Among some Dutch scientists and tradesmen, Engelbert Kaempfer (1651–1716), a physician on Deshima from 1690 to 1692, published *The History of Japan in Dutch* in 1727 (Europalia 1989). This book was translated into English immediately (OED). Examples of Japanese words in this book are: *Shinto, samurai, mikado* 'an emperor of Japan', and *Zen* (OED).

Repeated attempts to breach Japan's isolation succeeded only in deepening the nation's fear of foreigners. Czar Nicholas I organized an unsuccessful Japan expedition in 1852. Around this time the Tokugawa shogunate was already vulnerable and internally divided on the issue when in July 1853 the United States naval squadron under the command of Commodore Perry arrived at Edo (now Tokyo) Bay (Hosley 1990).

The honorific word, *taikun*, was used to address the shogun by visiting Westerners. In the United States, the use of this word caught on after Perry's expedition fired the imagination of the American public. John Hay (1861) spoke of Abraham Lincoln as the *tycoon* meaning a powerful person. Specialization of meaning set in again when industrial magnates began to be considered comparable, in their power and wealth, to the former political ruler of Japan (MWWH, OED).

The first English language book on Japan was *The Capital of the Tycoon: Narrative of a Three Year's Residence in Japan* by Sir Rutherford Alcock in 1863 (Lehman 1978). Fifteen years later he helped introduce Americans to Japanese art in a series of articles for a magazine called *Art Journal*. With this initiative, Japanism was born and a process set in motion. The Philadelphia Centennial Exposition in 1876 displayed a great deal of Japanese arts and crafts. The Centennial planted an idea about Japanese arts in the public's consciousness and Japan in the mid-nineteenth century was much admired in certain artistic circles. Moreover, as early as 1876 it was recognized that Western collectors had already possessed much of Japan's best art and eventually the trade of Japanese arts and crafts became a multi-million dollar industry (Hosley 1990). In this environment, many items related to Japanese arts flooded the art catalogues. *Arita* (1876), *Hirado* (1880), and *Imari* (1880) are just a few examples of the brand names of porcelain (OED). *Netsuke* (1876) 'a small and often intricately carved toggle used to fasten a small container to a kimono sash' seems to be popular among Western collectors, but this small ornament is almost unknown in Japan. *Makimono* (1882) 'a horizontal calligraphic scroll' and *kakemono* (1890) 'a vertical calligraphic scroll' were also introduced. This 'Japan craze' in the West 'was mirrored in the westernization craze that occurred simultaneously in Japan' (Hosley 1990:48). Books on Japan and Japanese art circulated widely during the nineteenth century. These include domestic-advice books, travel guides, histories, and a few translations of Japanese literature (Lehman 1978).

World War II influenced the American vernacular in many ways. Some examples of these are as follows:

1. banzai attack (1944): 'a reckless desperate mass attack originated by Japanese soldiers and accompanied by yells of "banzai" ['hooray'] and insulting taunts'(W3).
2. kamikaze (1945)
3. honcho (1947): The noun, meaning 'chief officer or man in charge' was brought back from Japan by fliers stationed there during the American occupation. Today it means 'boss or big shot'. It was broadened to a verb meaning 'to direct, or lead' in the 1960s (DC, OED).

ARTS	LANGUAGE	RELIGION	DAILY LIFE	HISTORY
		bonze (1588)		
inro (1617)			tatami (1614)	
	kana (1727)	satori (1727)		daimyo (1727)
	katakana (1727)	Shinto (1727)		mikado (1727)
		Shingon (1727)		samurai (1727)
		torii (1727)		shogun (1727)
		Zen (1727)		
koto (1795)				
	Ainu (1823)			
				tycoon (1857)
	hiragana (1859)			Nipponese
(1859)				
samisen (1864)			hibachi (1863)	
Noh (1871)			tokonoma (1871)	Meiji (1873)
netsuke (1876)			jinrikisha (1874)	genro (1876)
ukiyo-e (1879)	tanka (c.1877)		futon (1876)	
makimono (1882)			obi (1876)	
			shoji (1880)	
			geta (1884)	
			kimono (1886)	
			rickshaw (1887)	
kakemono (1890)			go (1890)	
Kakiemon (1890)				
Kabuki (1899)	hokku (1898)			
bonsai (1900)				
ikebana (1901)	haiku (1902)			
Bunraku (1920)	kanji (1921)			
gagaku (1929)				nisei (1929)
				issei (1937)
				banzai (1944)
		koan (1945)	honcho (1947)	kamikaze
(1945)				
origami (1956)			hootch (1960)	
			shiatsu (1967)	
			karaoke (1982)	

Table 1. Japanese loanwords in English (PART I) in *Merriam Webster's Collegiate Dictionary* Tenth Edition (1994).

In 1882 Jigoro Kano (1860-1938) developed his own school of traditional martial arts which he called the Kodokan. He named his style of *jujitsu, judo.* However, judo did not develop rapidly outside of Japan until after World War II, when GIs brought it back to the United States. Since the1950s, enthusiasm for judo has spread further throughout the United States (Kim 1977). *Dojo* (1942) is 'a school for training in various arts of self-defense (as judo or karate)'. Stimulated by the popularity of judo, *karate* (1955), *aikido* (1956), and *iaido* (1976) were introduced (Kim 1977).

CULINARY	SPORTS MARTIAL ARTS	SCIENCE TECHNOLOGY	BUSINESS	OTHERS
soy (1679)				
sake (1687)				
miso (1727)		koi (1727)		
shoyu (1727)				
tofu (1771)		ginkgo (1773)		
soy bean (1802)				hara-kiri (1840)
daikon (1876)	jujitsu (1875)	kudzu (1876)	yen (1875)	seppuku (1871)
shiitake (1877)			sen (1875)	sayonara (1875)*
sashimi (1880)	sumo (1880)	satsuma (1882)		geisha (1887)
	judo (1889)			
nori (1892)				
sushi (1893)		tsunami (1897)		banzai (1893)
wasabi (1903)		tsutsubamushi		
disease (1906)				
fugu (1909)		urushiol (1909)		
sukiyaki (1920)				
tempura (1920)	kendo (1921)	fuji (1925)		
		Akita (1928)		haniwa (1931)
		medaka (1933)		
	dojo (1942)	shigella (1937)		
	kata (1945)	yagi (1943)		
	karate (1955)	shigellosis (1944)		
	aikido (1956)			skosh (1952)
dashi (c.1961)				
rumaki (1961)				
teriyaki (1962)				
yakitori (1962)				gaijin (1964)
	nunchaku (1970)			ninja (1975)
napa cabbage (1980)		Walkman (1981)*		
enokidake (1983)		kanban (1982)		

*In these cases, the W10 does not indicate the dates, and the dates cited are from the OED.

Table 2. Japanese loanwords in English (PART II) in *Merriam Webster's Collegiate Dictionary* Tenth Edition (1994).

After the American occupation until 1952, Japan first began to export some of its cultural attractions, partly in order to stimulate tourism. In 1954 the first live *Kabuki* was introduced in the United States. *Ryokan* (1963) 'a traditional style inn' and *koban* (1967) 'a police substation' were introduced in the 60s (Johnson 1988).

From the middle to the late 1960s to the 1970s, Japanese food started to become popular. Table 2 shows that many words of food have relatively old dates (i.e., some of them are over one hundred years old). However, the dates

	SCIENCE TECHNOLOGY	BUSINESS POLITICS	DAILY LIFE	OTHERS
1960s			mingei (1960)	Japlish (1960)
			ryokan (1964)	ninjutsu (1964)
			yakuza (1964)	
			eroduction (1965)	
		zaikai (1968)	koban (1967)	burakumin (1967)
			beddo (1969)	
1970s		shokku (1971)	koza (1972)	
		kuromaku (1974)	Yamaguchi-gumi (1973)	
		Nikkei index (1974)		
		sarakin (1979)	gengo (1979)	
1980s	Kawasaki disease (1981)	Euroyen (1980)		
		Atari democrat (1983)		
		Atari socialism (1983)		
	Pac-man (1982)	haragei (1983)		
	mechatronics (1982)	Etsuzankai (1983)		
		hara-kiri swap (1984)		
	Camcorder (1985)	sokaiya (1984)	oseibo (1984)	
		kaizen (1985)		
	Betamax (1986)	zaitech (1986)		
		kinken seiji (1989)		Ninja Turtle (1988)
	Nintendo (1989)	glocal (1989)	juku (1989)	
1990s	Nintendo epilepsy (1990)			
	Nintendo booking (1991)			
	Nintenditis (1993)			

Table 3. Recent Japanese loanwords in English (PART I) in *The Barnhart New-Word Concordance* (1994).

indicate only those attested in publications. For instance, according to research, in 1973 almost no one in the United States knew the word *sushi* (Johnson 1988:105). Culinary innovation has been matched by lexical innovation. Loanblends, *soyburger* (1982) (soy + burger) and *Tofutti* (1981) (tofu + tti) 'a non-dairy frozen dessert with an ice-cream taste' were invented by Americans. *Tofutti* was formed on the analogy of *tutti-frutti* (Cannon 1994).

Futon (1876) was cited in some books on Japanese culture over a century ago. But the present Western application dates from the early 1980s (ODNW). 'The *futon* as marketed in the West may include a slatted wooden base which

	ARTS	SPORTS MARTIAL ARTS	CULINARY
1960s	daruma (1963) hashigakari (1967)	budo (1964) kumite (1965) karate (vt.) (1966) karate chop (1966) karateka (1966) ozeki (1966) yokozuna (1966) dan (1966)	sanpaku (1963)
1970s	shakuhachi (1970) hanamichi (1971)	sumotori (1973) basho (1976) iaido (1976)	umami (1979)

Table 4. Recent Japanese loanwords in English (PART II) in *The Barnhart New-Words Concordance* (1994).

stands only a few inches from the floor. It is often capable of conversion into a sofa for day-time use, and usually includes a stuffed cotton mattress similar to the Japanese version' (ODNW:123-24).

Since the 1970s Japanese business and quality control have been widely discussed in magazines and read on college campuses, particularly in business schools (Johnson 1988). The following words reflect the trend: (1) *shokku* (1971) 'to denote a shock or surprise in political or economic affairs concerning Japan as in oil *shokku* (< English *shock*)', (2) *kanban* (1982) 'a system of manufacturing in which the delivery of components to be assembled is carefully coordinated so as to reduce inventory', (3) *haragei* (1983) 'the form of nonverbal communication operative in companies in which a more traditional and hierarchical chain of command is inappropriate'. In the late seventies and eighties Western economic and financial sources started to publish figures from the *Nikkei index* (< Japanese ***Ni**hon **Kei**zai Shimbun* 'Japanese Economic Journal' the title of Japan's principal financial newspaper) (ODNW).

Japan is now heavily involved in international trade. *Zaitech* (1986) means 'large-scale financial speculation engaged in by a company'. As the number of Japanese business people working in countries outside Japan began increasing, they came to need their recreation after work. As a result, they brought *karaoke* (1982). It is a 'device that plays instrumental accompaniment for a selection of songs to which the user sings along'.

4. A BRIEF LINGUISTIC ANALYSIS OF JAPANESE LOANWORDS IN ENGLISH. The majority of Japanese loanwords in English are nouns. For the most part, the pronunciation of these words is close to the original Japanese. In general a loanword has only one meaning and faithfully conveys its Japanese meaning.

Overall, these loanwords in English have no vulgar or obscene connotations except for those loans from the time of World War II. The semantic fields of Japanese loanwords include swords, food and drink, martial arts, sports, fine arts, business, trademarks, science, technology, politics, and religion. Most of these words are technical terms in their respective fields. Some of the borrowings that came about since the 1970s are from English loanwords in Japanese. *Shokku* is a re-borrowed English shock. Some other English loanwords are, strictly speaking, LOANBLENDS. One type of loanblend is made up of a Japanese element and an English one, for example, *karaoke* (< Japanese *kara* 'empty' + *oke* (Japanese *okesutora* < English *orchestra*)). The other type is a compound that Japanese speakers create from English elements, for example, *Walkman* ('a small portable radio or cassette player listened to by means of headphones or earphones' < trademark). This is due to the ongoing adoption of English loanwords by the Japanese since the nineteenth century. Today there are over 25,000 English loanwords in Japanese (Kay 1995).

5. CONCLUSION. English has been steadily enriched by lexical borrowing. In fact, by 1987, Japanese and Spanish tied for second place after French among the recent donor languages of loanwords into English (Cannon 1994). The number of new English words since the 1980s have expanded in business and investment, ever-advancing computer technology and social change (Barnhart 1995:61). New borrowings from Japanese parallel this trend. These phenomena indicate, first, the relatively easy pronunciation of Japanese words for English speakers and, second, and more importantly, the promotion of worldwide trade and communication. The advent of the information age will surely help increase contacts between languages worldwide at a faster speed. Based on this assumption, the number of Japanese loanwords in English will continue to grow.

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CONSONANT CLUSTER OR AFFRICATE? THE EFFECTS OF SYLLABLE POSITION ON SPEAKERS' JUDGEMENTS

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1. INTRODUCTION.* Traditionally, affricates have been treated as either a consonant cluster consisting of a stop plus a homorganic fricative or as a single unit of stop with a fricative release. It is a matter of conjecture as to whether, in a phonological description, affricates form a single functional unit or a sequence of two phonemes which function as separate units (Hawkins 1984; Ladefoged 1993; Clark & Yallop 1990). If affricates form a unit functionally, then they should be harder to separate in segmentation tasks. If they are a sequence of sounds, then they should be more readily separated, and combinations such as /st/ and /ts/ should be treated in a similar manner.

This paper describes a series of experiments which were carried out to assess the segmentability of stop-fricative (SF) and fricative-stop (FS) combinations by native speakers of an unwritten language called Plautdietsch (PD), a Low German dialect spoken in southwestern Saskatchewan. An unwritten language was chosen to minimize orthographic effects, since research into the psychological reality of phonological units has been hampered by the interference of orthography (see Dow 1981; Derwing & Nearey 1981; Derwing, Nearey & Dow 1986; Wiebe 1992). The PD speakers are literate in English (and thus presumably able to segment phonemically in that language) but illiterate in their mother-tongue (and thus not guided by orthographic norms in the segmentation strategies under investigation).

Traditionally, High German and many of the German dialects have been described as having the affricates /ts/, and /pf/, as well as the less frequent /tʃ/ and /dʒ/. It has also been proposed that English, the second language of all the subjects and principle language of many of them, has the affricates /tʃ/ and /dʒ/. There has never been any real discussion in the literature of the possibility of affricates in PD; in fact, most of the traditional studies of PD never mention affricates (Thiessen 1963; Mierau 1965; Goerzen 1972; Wiebe 1983). Only the studies of Mierau (1965) and Goerzen (1972) mention clusters at all, and these are just lists of all the possible linear combinations of con-

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Type of CC	Example	Cohesion of CC	Totals
Initial FS		42%	
/ʃt/ (1)	/ʃtreml̩/	52%	
/ʃp/ (1)	/ʃplet/	32%	
Initial SF		36%	
/tv/ (1)	/tvalv/	8%	
/k'v/ (1)	/k'veʌk'/	16%	
/ts/ (2)	/tsɪpl̩/	85%	
Overall Cohesion of Initial Obstruent Clusters			39%

Table 1. Segmentation of initial consonant clusters. ( ) indicates number of tokens for each type.

sonants. However, Wiebe (1992) discussed the possibility that all of the above mentioned combinations (except for /pf/, which never occurs[1]) could be considered to be affricates in PD.

There are four standard arguments for treating the sequence /ts/, for example, as a single unit in PD. First, all phonetic sequences of stop plus fricative, especially if they are homorganic like /t/ and /s/, can be viewed as affricates. Second, /ts/ contrasts with other phonemes, e.g., /tak/ 'tock' vs. /tsak/ 'peak' vs. /zak/ 'sack'. Third, /ts/ occurs initially, medially and finally (e.g., /tsiz/ 'gulp'; /bitsl̩/; 'bee sting'; /mits/ 'kitty') and before /v/, like other stops (/tsvak'/ 'purpose'; /tve/ 'two'; /dvol/ 'rush'; /kvak/ 'quack'). Fourth, when PD speakers borrow words from other languages beginning with /s/, which does not occur word-initially in PD, they either voice the /s/ to /z/ ('sack'→/zak/) or replace it by /ts/ which can occur initially ('size'→ /tsajz/).

However, as Clark and Yallop (1990) point out, there are difficulties associated with distinguishing between a sequence of segments and a single segment, particularly for complex articulations such as affricates. They even suggest some languages such as English may distinguish between one and two segment articulations as in '*he cheats* versus *heat-sheets* or *what can each add?* versus *what can eat shad?*'. Moreover recent research has shown that the cohesiveness of several types of sequences can be affected by syllable position (Wiebe 1992, 1993; Wiebe & Derwing 1992, 1993).[2]

Type of CC	Example	Cohesion of CC	Totals
Initial FS		35%	
/ʃt/ (2)	/miʌʃt	18%	
/ʃp/ (2)	/k'ast/	40%	
/çt/ (2)	/traçt/	48%	
Initial SF		45%	
/kʃ/ (1)	/nækʃ/	42%	
/ps/ (1)	/rɛlps/	33%	
/tʃ/ (1)	/lutʃ/	44%	
/ts/ (7)	/blɪts	59%	
Overall Cohesion of Initial Obstruent Clusters			40%

Table 2. Segmentation of final consonant clusters. ( ) indicates number of tokens for each type.

In order to assess whether PD speakers treat /ts/, /tʃ/ and /dʒ/ as single units, i.e., as affricates, or as clusters of stop plus fricative, and whether syllable position affects native speakers' treatment of these units, a series of experiments were conducted. These involved both (1) a Segmentation and Spelling Task and (2) a Deletion-Recognition Task.

2. THE SEGMENTATION AND SPELLING TASK. In the first experiment, twenty-five English and PD speaking bilingual adults (12 male; 13 female) were given a Segmentation Task, followed by a Spelling Task. In both tasks subjects listened to a list of 62 PD words, 3-6 phonemes in length, spoken by a female native PD speaker. The Segmentation Task is a variant of the same procedure used previously in the study of pre- and postvocalic resonants (Wiebe & Derwing 1992, 1993; Wiebe 1993).

2.1. SEGMENTATION TASK. In the Segmentation Task, subjects were asked to segment PD words into 'speech sounds' after they were trained on a few noncontroversial examples in English (e.g., *cat, smack, laugh, gives, debt, attack, batman*). The general segmentation patterns that emerged suggested that subjects' segmentation preferences were affected by a unit's environment, as well as cluster type (See Table 1).

It can be seen from Tables 1 and 2 that word-initial FS is more cohesive (42%) than word-initial SF (36%) and that word-finally SF is more cohesive than FS, but that overall the obstruent clusters display similar cohesiveness patterns (initially 39% and finally 40%). However, if the individual cluster types are examined, it appears that final /ts/ was more often treated as a unit (59%) than other final SF or FS clusters. Similarly in word-initial position, /ts/ was unitized in 85% of the responses contrasting sharply with other initial obstruent clusters. These results suggest not only that /ts/ is the most cohesive of all these clusters, but also that /ts/ is much more cohesive in the onset (word-initially) than in the coda (word-finally).

2.2. SPELLING TASK. The purpose of the spelling task was to see what invented spellings might reveal about the status of the sequences under investigation. The subjects taking part in this experiment have little opportunity to read or write PD, so any spellings they invent might reflect the spoken form of their dialect more readily than a standard orthography of English would reflect the pronunciation of an English dialect. In theory, if subjects group sounds together in a Segmentation Task, they should use fewer graphemes when spelling that group of sounds.

The same PD speakers who participated in the Segmentation Task also took part in the Spelling Task. Subjects were told they would hear the same words again and were asked to write down the words using any combination of letters that they felt were necessary, but they were asked not to use any unnecessary letters. They were reminded that we were interested in the speech sounds and they were cautioned to forget about any English or German spelling rules that they might know.

In the analysis for the Spelling Task each subject's spelling of a test word was paired with her segmentation of that particular word produced during the Segmentation Task. In this way it was possible to see if there was a consistent grapheme-phoneme correspondence. If a subject used one grapheme for one segment or two graphemes for two segments and so on, then it was assumed that these segments were non-complex units for that subject. If, however, a subject used two graphemes for one segment, then several interpretation possibilities arose. First, the subject could be using a digraph to represent a single sound; for example, /ʃ/ may be written <sh> as in English. Second, the subject might have thought that there was only one segment but that this segment was more complex than some others and might have wanted to represent this in the spelling. Third, the subject might have felt there was only one sound in the Segmentation Task, but on further deliberation during the Spelling Task might have decided that there was, in fact, more than one segment, and reflected this reanalysis in the spelling.

Type of CC		Cohesive Units Spelled with 1 Letter
Initial	FS	13%
	SF	17%
	/ts/	92%
Final	FS	5%
	SF	18%
	/tʃ/	0%
	/ts/	27%

Table 3. Combined results of spelling and segmentation tasks. Representations of cohesive initial and final consonant clusters.

In Table 3 above it can be seen that those subjects who treated the FS and SF as units in the Segmentation Task, generally spelled the SF and FS clusters with two letters, even though they may have unitized these clusters. It can also be seen that subjects who treated obstruent clusters as a unit in the oral task were more likely to spell these clusters with one letter in word-initial than word-final position.

No subjects used one letter for the affricate /tʃ/, as the standard English spelling is either <ch> or <tch>, and the spelling in German is <tsch>. Those who unitized /tʃ/ in the oral task and used the digraph <ch> (38%) in the writing task may indeed be treating /tʃ/ as an indivisible unit. The other 62% who used <tch> may be using a trigraph for a single segment (as in the English orthographic system), or may be aware that the affricate /tʃ/ and the stop /t/ have some features in common.

The affricate /ts/, which was most often unitized in both positions (see Tables 1 and 2), was also most often spelled with a single letter, especially word-initially (see Table 3). Some subjects who are familiar with High German adopted the standard High German spelling <z> for initial /ts/, as /ts/ does not occur word-initially in English. The rest (53%) used either <t> or <s>. So it would seem that most subjects were using a single grapheme for a single phonological unit.

That /ts/ was more often spelled with two letters word-finally is not surprising, as this sequence appears word-finally in both English and High German and is typically spelled with two letters in both (English <ts> and High German <tz>). As all subjects are literate in English, one would expect them to use two letters when writing this cluster. What was unexpected was that 27% of the subjects who treated this affricate as unsegmentable in final position, spelled it with only one letter, a non-standard spelling in English (cf. <cats> or <Katz>). This is good supporting evidence for a monosegmental treatment by some subjects, even in word-final position.

Ewen (1982), using a dependency phonology framework, offers an explanation for the difference between /ts/ in English and in German. He maintains that /ts/ and other affricates have a reversed dependency structure, whereby the more sonorant element or fricative is dependent on the less sonorant element or stop, and this should hold for initial and final position. In German, initial and final /ts/ are identical and behave as units in both positions. However, initial and final /ts/ in English are not identical. Final /ts/ is a mirror-image of initial /st/ where /t/ is simultaneously dependent on both /s/ and the vowel. Moreover, according to Ewen, final /ts/ in English has the length of a normal cluster whereas the affricate /ts/ in German has the length of a single segment. This might also explain why PD subjects more easily separate /ts/ in final position and more readily treat initial /ts/ as a unit. Even though PD is a Low German dialect, through years of contact with English it has been influenced by English, including its phonology (see Wiebe, 1983). Thus, PD speakers might have been influenced by English phonology for final /ts/, which occurs both in English and PD, but not for initial /ts/, which does not occur in English.

Another reason for the difference in cohesion between initial and final /ts/ might be that some FS and SF clusters arise in both English and PD due to morphological processes. Therefore, subjects would have more practice in separating consonants in final position than in initial position by the mere fact of deleting or adding inflectional morphemes in everyday use. However, the overal results indicate no real differences between initial and final obstruent clusters except for /ts/. Whatever the reason for this difference in cohesiveness between initial and final /ts/, not to mention the differences between other initial and final SF clusters, it was clear that more work needed to be done in this area.

3. THE DELETION-RECOGNITION TASK. A Deletion-Recognition Task was thus performed to see if the results of the Spelling and Segmentation Tasks were task-specific and to further investigate the status of affricates other than /ts/ in PD. It was also crucial to more fully explore /tʃ/ which, due to an oversight, occurred in only one word in the Segmentation/Spelling Task and then only in word-final position.

3.1. FINAL CONSONANT DELETION-RECOGNITION TASK. Thirty PD speakers were trained to recognize final consonant deletions and then were given practice in recognizing word-pairs in which the final sound had been deleted (e.g. /dʊps-dʊp/). The test portion consisted of 75 word-pairs, interspersed by 17

Type			Examples		% YES		*d'*
			HITS	FAS	HITS	FAS	mean
FS	/ʃt/	(10)	/nuʃt-nuʃ/	/nuʃt-nu/	80.83	21.67	4.79***
	/st/	(20)	/lɔst-lɔs/	/lɔst-lɔ/	80.37	33.33	3.65***
SF	/ts/	(22)	/mɛts-mɛt/	/mɛts-mɛ/	75.83	37.50	2.81***
	/tʃ/	(9)	/ditʃ-dit/	/ditʃ-di/	61.67	30.00	2.55***
	/kʃ/	(9)	/bukʃ-buk/	/bukʃ-bu/	58.33	25.00	3.10***
	/dʒ/	(15)	/ʒɛrdʒ-ʒɛrd/	/ʒɛrdʒ-ʒɛr/	61.67	60.00	0.21

*** = significant ($p<0.001$)
( ) = number of tokens for each type

Table 4. Deletion of final obstruent clusters

reinforcement items (for which the correct answer was supplied). Subjects listened to these word-pairs spoken by a female native PD speaker and were asked to judge if the pairs followed the pattern they were trained on or not.

In this task, deletion of a single final consonant is defined as the 'nominally correct' pattern. If subjects correctly judged that the final consonant in a pair was deleted, this was coded as a HIT. A high HIT rate would indicate consonant separability, or a tendency for the cluster to separate and not be treated as a unit. A FALSE ALARM (FA) corresponds to a 'yes' reply to more than one consonant in a consonant cluster being deleted together. Thus, a high FA rate would suggest consonant cohesiveness, or a positive tendency to be treated as a unit. A 'correct' pattern detectability measure, *d'*, was calculated as a function of HIT and FA rates (Derwing & Nearey 1988; McNicol 1972). A large *d'* value results from a high HIT rate and a low FA rate. Thus, a high positive *d'* means that a sequence is highly separable and not to be treated as a unit. On the other hand, a low HIT rate and a high FA rate with low or even large negative *d'* values would mean that a sequence was cohesive or tended to act as a single unit. Using a paired difference t-test of *d'*, a comparison was also made of all the final clusters.

If we compare the HIT rates in Table 4 with the HIT rate of 93% for the reinforcement items, that is, the training and practice items which were interspersed amongst the test items, the HIT rates of final SF and FS clusters are relatively low. The deletion of a final stop (/t/ from /st/ and /ʃt/) has an approximate HIT rate of 80%, and the deletion of a final sibilant fricative (/s , ʃ, ʒ/ from /ts/, /kʃ/, and /dʒ/) has a HIT rate of approximately 64%, suggesting that in final position SF clusters are more cohesive than FS clusters. Note, however, that final /dʒ/ is equally likely to be unitized or separated as the HIT and FA rates are virtually identical (62% and 60%),[2] and the d' rate, although still positive, is very low (0.21) and not significant.

Type			Examples		%YES		*d'*
			HITS	FAS	HITS	FAS	mean
FS	/ʃt/	(10)	/ʃtæp-tæp/	/ʃtæp-æp/	70.83	40.00	3.48**
	/st/	(20)	/stuʌ-tuʌ/	/stuʌ-uʌ/	76.67	31.67	2.39**
SF	/ts/	(22)	/tsap-sap/	/tsap-ap/	66.11	59.44	1.15*
	/tʃ/	(9)	/tʃɔrt-ʃɔrt/	/tʃɔrt-ɔrt/	49.17	60.00	-0.79
	/dʒ/	(5)	/dʒak-ʒak/	/dʒak-ak/	45.00	80.00	-2.69**

* = significant ($p<0.05$)
** = significant ($p<0.01$)
( ) = number of tokens for each type

Table 5. Deletion of initial obstruent clusters.

The d' rate for the rest of the final obstruent clusters, are all positive and indicate a significant difference between the HIT and FA rates, suggesting a general tendency for voiceless final obstruent clusters to separate. However, the lower HIT rates of 58% for /kʃ/, and 62% for both /tʃ/ and /dʒ/ indicate that subjects were less certain as to the separability of final SF clusters containing a palatal fricative.

If the results of a paired difference t-test of d' which show that /ʃt/ is significantly different from all others is taken along with the fact that /ʃt/ has the highest HIT rate and the lowest FA rate, it can be seen that /ʃt/ is significantly less cohesive than the other final obstruent clusters. The only voiced word-final obstruent cluster, /dʒ/ is also significantly different from the voiceless clusters indicating that /dʒ/ is more cohesive than the other final obstruent clusters.

A cohesiveness scale could thus be built with /ʃt/ at the low end of the scale (least cohesive) and /dʒ/ at the high end of the scale (most cohesive) and the other clusters, with about equal relative cohesiveness, in the middle. It is interesting to note that one of the putative affricates /dʒ/ acts more like a unit than /tʃ/ and /ts/, and that the other putative affricates, /tʃ/ and /ts/, as well as /st/, a non-affricate, are about equally likely to be treated, word-finally, as single units or as two-segment clusters in this language.

3.2. INITIAL CONSONANT DELETION-RECOGNITION TASK. Sixty PD speakers were given training and practice sessions on the recognition of a word-initial deletion of a single consonant. They then were given 73 word-pairs as test items interspersed with 17 reinforcement items. Of the test items, 15 were FS clusters (/ʃt/ and /st/) and 14 were SF clusters (/tʃ/, /ts/ and /dʒ/[3]). In this task the target or 'nominally correct' manipulation is to delete the first consonant, thus a high HIT rate would indicate a tendency for the consonant to separate and a high FA rate would suggest consonant cohesiveness. As in the Final Consonant Deletion-Recognition Task above, d' a measure of detectability of the nominally correct pattern was calculated with high positive values indicating consonant separability and low or negative values implying cohesiveness.

Initial /st/ has a higher HIT rate and a lower FA rate than initial /ʃt/; thus subjects tended to treat /ʃt/ as a unit more often than they did /st/. However, as the d' reaches significant positive values for both, the initial FS clusters were not generally treated as single units. The initial SF clusters had relatively low HIT rates and high FA rates compared with the FS clusters. These results suggest that all of the initial SF clusters are, to a certain extent, treated as a unit. Moreover, the negative d' rates for /tʃ/ and /dʒ/ mean that subjects preferred to treat them as single units so it would appear that initial /tʃ/ and /dʒ/ are even more cohesive than initial /ts/.

A paired difference t-test revealed a relative difference among the initial obstruent clusters, with /ʃt/ significantly less cohesive than others, except /ts/, and with /dʒ/ and /tʃ/ significantly more cohesive than all the rest. Initial /ts/ was also found to be significantly more cohesive than /st/. A cohesiveness scale could be built with /ʃt/ at the low end of the scale (least cohesive) and /dʒ/ at the high end of the scale (most cohesive) and the other clusters, with about equal relative cohesiveness, in the middle. If these results are compared with those of the Final Consonant Deletion-Recognition Task above, it can be seen that this scale is strikingly similar, except that it is possible to differentiate among more of the initial clusters than the final ones, as /tʃ/ can be seen to behave more as a unit in initial position than in final position. This result is consistent with the results of the Segmentation Task.

4. SUMMARY AND DISCUSSION. The findings of the Segmentation/Spelling Task and the Deletion Recognition Tasks have provided some insight into the cohesiveness of affricates and other obstruent clusters in PD. In the Segment Count Task, it was found that initial consonant clusters were no more cohesive than final clusters (overall 39.5% cohesiveness for both). The affricate /ts/, which demonstrated a remarkably different cohesiveness pattern to the other SFs, was much more cohesive both initially (85%) and finally (59%) than the other obstruent clusters and somewhat more cohesive than word-final /tʃ/ (44%), the only other affricate tested in this task. It appears that /ts/ should be treated as a monosegmental affricate, especially in syllable-initial position. It seems, therefore, that the position of the phonological unit affects its cohesiveness.

In the Deletion-Recognition Tasks, it was found that obstruent clusters in the coda and the onset were treated in similar manners. In both initial and final position the FS clusters, /ts/ and /ʃt/, were most often treated as separable and least often treated as a unit. However, both /ts/ and /ʃt/ were more likely to be separated in the coda than in the onset. At the other end of the scale, /dʒ/ was the most often treated as a unit and the least often separated of all the obstruent clusters. The other clusters (all FS) occupy a place intermediate to the two extremes.

Traditionally, High German and many of the German dialects have been described as having the affricates /ts/ and /tʃ/. Word-initially /ts/ and /tʃ/ have very high FA rates (approximately 60%), so subjects find these to be acceptable as units in the onset. In fact, initial /tʃ/'s FA rate is higher than its HIT rate. So, /tʃ/ could be said to achieve monosegmental affricate status word-initially in PD, with the possibility that /ts/ may also be a monosegmental affricate word initially. In word-final position the FA rates for both /ts/ and /tʃ/ are lower than for those in initial position and significantly lower than their HIT rates. So perhaps subjects treat these affricates as single units in word-initial position but not in word-final position.[4] This is odd, but it may have an orthographic transfer basis. In English affricates like /dʒ/ and /tʃ/ are often spelled with an extra letter in final position as in <badge> and <pitch> (cf. <page> and <rich>), which, as Ehri and Wilce (1980) have shown, may cause subjects to count extra sounds based on the number of letters in a word.

English, the second language of all the subjects and principle language of many, has the affricates /tʃ/ and /dʒ/. Although, the voiceless affricate /tʃ/ may occur in PD in both word-initial and word-final position, the voiced affricate /dʒ/ presents some special problems, as its presence in PD in initial position is due to borrowing from English. If words containing /dʒ/ in initial position are borrowed from English, then the expected deletion pattern would be one where the entire affricate is deleted. To be sure, subjects accepted this deletion 80% of the time (FAs mentioned above), which is higher than the separation of /dʒ/ (45% HIT rate). It seems that subjects preferred to treat /dʒ/ as a unit, which suggests it also is a monosegmental affricate in PD word-initially. Word-finally, /dʒ/ is acceptable as a unit (60%), but was also acceptable as a sequence of separate entities (62%). So the status of /dʒ/ as a unit in final position is still unclear.

All three affricates, /ts/, /tʃ/ and /dʒ/ were more likely to be treated as a unit in initial position than in final position. The tendency to separate these clusters in final position may be due to speakers' familiarity with the addition or deletion of fricatives in some English morphemes such as 3rd-person singular, plurals and possessives. In fact, in both English and PD, subjects are used to adding and deleting sounds at the end of words but not at the beginning (e.g., PD /vauʃ/ 'wash', /vauʃt/ 'washed'; or English /mɪt/ 'mitt', /mɪts/ 'mitts'. Therefore, it seems reasonable that subjects would exhibit a greater ability to manipulate such word-final combinations.

5. Conclusion. The results of the Segmentation, Spelling, and Deletion Recognition Tasks indicate that syllable position affects the cohesiveness of phonetically complex units such as affricates. It appears that bond strengths between elements such as homorganic SF units vary, depending both on the unit itself and on its position in the syllable. In light of these results it seems that traditional accounts of the affricate are inadequate to describe a PD affricate.

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[1] The affricate /pf/ is present in High German and most southern German dialects, but does not occur in PD, which originates from northern German dialects.

[2] English spelling, where /dʒ/ is spelled <j> and <dge> as in <judge> or <ge> as in <page>, may be influencing subjects' judgements here.

[3] Only three SFs were tested, as /kʃ/ does not occur word-initially in PD.

[4] The possibility remains that for some subjects these are monosegmental affricates and for others they are not. However, no significant individual variations were observed in the variables tested with repeated measures ANOVAs.

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COLOPHON

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